

CHAPTER 9: PROPOSED PHASE III EARLY RESTORATION PROJECTS: LOUISIANA

9.1 Introduction

For many years, public input regarding the types of restoration projects that could best compensate the public for natural resource damages caused by oil spills in Louisiana has been actively solicited and integrated into planning activities through Louisiana's Regional Restoration Planning (RRP) Program.¹ Following the Spill, the Trustees engaged coastal stakeholders in Louisiana through a variety of public outreach and coordination efforts to discuss the NRDA, the restoration planning process, and potential restoration projects specifically related to the Spill. In addition to the meetings discussed in Chapter 2 of this document, additional meetings with stakeholders have been held to convey information and solicit suggestions. For example, the Coastal Protection and Restoration Authority of Louisiana and the Governor's Oyster Advisory Committee have held public meetings in which restoration planning issues have been, and continue to be, discussed.

From these outreach efforts, and the State's existing RRP Program, the Trustees compiled a list of potential projects for restoration of natural resources in Louisiana injured as a result of the Spill. Project ideas received were, and will continue to be, considered for this and future phases of Early Restoration, as well as for comprehensive NRDA restoration planning. The Trustees continue to accept restoration project ideas.

Based on project evaluation standards and criteria set forth in the OPA regulations, the Framework Agreement, additional RRP Program-specific criteria (below), and additional screening considerations applied by NOAA and DOI (see Chapter 2), the Trustees propose two projects for Phase III of Early Restoration that would be implemented in Louisiana: 1) the Louisiana Outer Coast Restoration; and 2) the Louisiana Marine Fisheries Enhancement, Research, and Science Center. These projects satisfy evaluation criteria outlined in the OPA regulations, the Framework Agreement, and the RRP Program, and are consistent with the goal of compensating the public for natural resource injuries resulting from the Spill.

¹ Louisiana's RRP Program identifies the statewide Program structure, defines those trust resources and services in Louisiana that are likely to be or are anticipated to be injured (*i.e.*, at risk) by oil spill incidents, establishes a decision-making process, and sets forth criteria that are used to select restoration project(s) that may be implemented to restore the trust resources and services injured by a given spill. The RRP Program's Final Programmatic Environmental Impact Statement (FPEIS), which may be viewed in its entirety at <http://www.losco.state.la.us/LOSCOUploads/RRPAR/la2395.pdf>, is hereby incorporated by reference into this document.

Additional Louisiana RRP Program criteria include:

- Ability to Implement Project with Minimal Delay;
- Degree to Which Project Supports Existing Strategies/Plans;²
- Project Urgency; and
- Other Factors as Appropriate.

The remainder of this chapter contains a subsection for each proposed Phase III project in Louisiana. Each project-specific subsection begins with a general description of the project and relevant background information, followed by: 1) a discussion of the project's consistency with project evaluation criteria; 2) a description of planned performance criteria, monitoring and maintenance; 3) a description of the type and quantity of Offsets BP would receive if the project is selected for implementation; and 4) information about estimated project costs.

Following this project information is a project-specific environmental review, which provides information and analysis about anticipated environmental consequences of each proposed project. Although each of the proposed projects falls within and is consistent with the Trustees' preferred Programmatic Alternative (Alternative 4) identified and evaluated in previous sections of this document (Chapters 5 and 6), the Trustees also have undertaken project-specific environmental reviews to help ensure proposed project locations, methods, timing and other factors reasonably maximize project benefits, minimize potential adverse consequences, and otherwise address environmental compliance needs.

In order to determine whether an action has the potential to result in significant impacts, the context and intensity of the action must be considered. Context refers to area of impacts (local, state-wide, etc.) and their duration (e.g., whether they are short- or long-term impacts). Intensity refers to the severity of impact and could include the timing of the action (e.g., more intense impacts would occur during critical periods like high visitation or wildlife breeding/rearing, etc.). Intensity is also described in terms of whether the impact would be beneficial or adverse. Both context and intensity were considered in the project-specific environmental reviews.

² *E.g.*, Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast ("Master Plan").

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9.2 Louisiana Outer Coast Restoration: Project Description

9.2.1 Project Summary

The Trustees propose to restore beach, dune, and back-barrier marsh habitats at four barrier island locations in Louisiana. From west to east, the four locations are Caillou Lake Headlands (also known as Whiskey Island), Chenier Ronquille, Shell Island (West Lobe and portions of East Lobe), and North Breton Island (Figure 9-1). The total estimated cost to implement Louisiana Outer Coast Restoration is \$318,363,000.

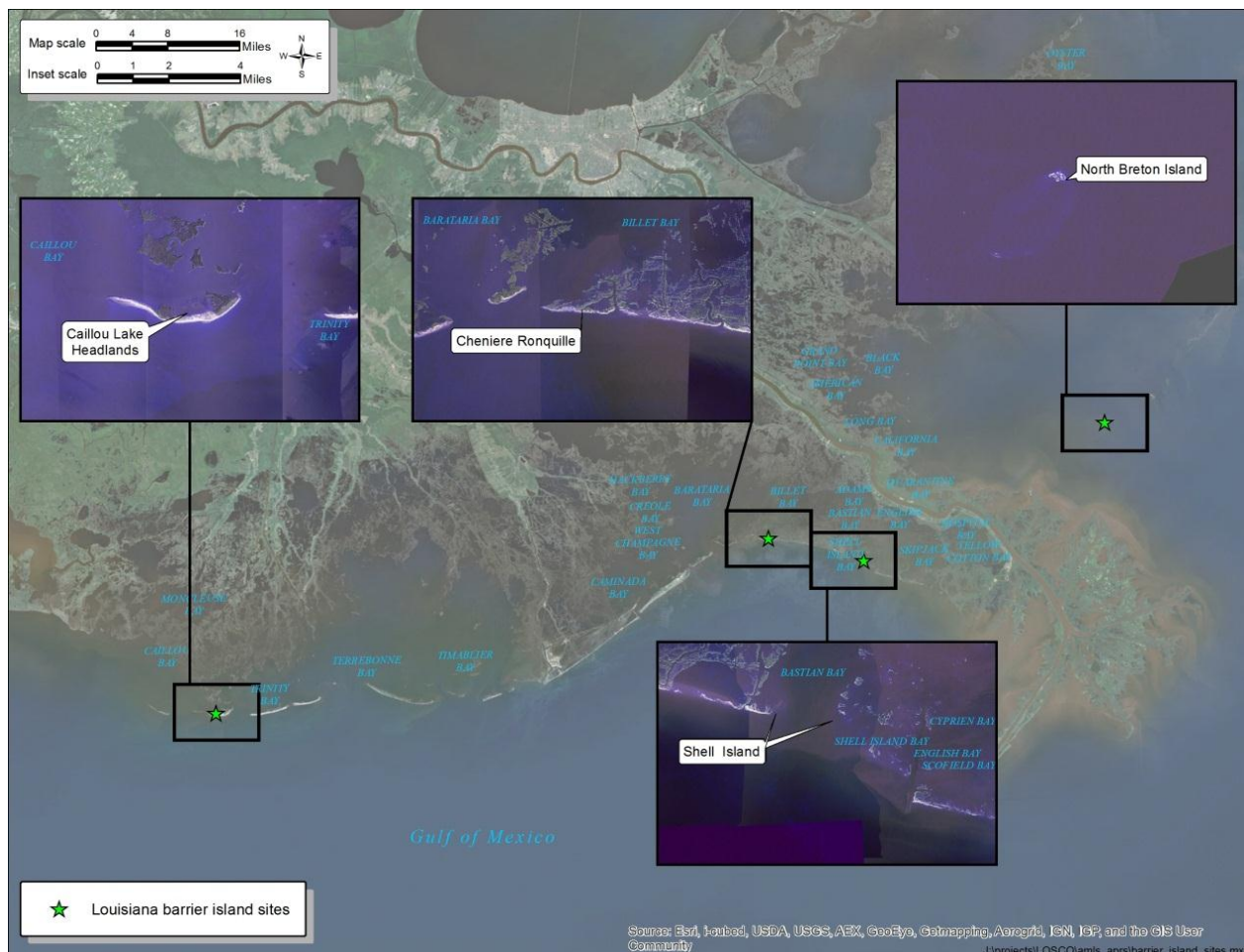


Figure 9-1. Louisiana Outer Coast Restoration locations. From west to east: Caillou Lake Headlands (also known as Whiskey Island), Chenier Ronquille, the West Lobe and portions of the East Lobe of Shell Island, and North Breton Island.

9.2.2 Background and Project Description

The goal of Louisiana Outer Coast Restoration is to restore beach, dune, and back-barrier marsh habitats in Louisiana, as well as brown pelicans, terns, skimmers, and gulls to help compensate the public for Spill-related injuries to these habitats and species. The restoration work proposed at each island involves placement of appropriately sized sediments to create beach, dune, and back-barrier marsh areas; installation of sand fencing to trap and retain wind-blown sediments and foster dune

development; and revegetation of appropriate native species in dune and back-barrier marsh habitat. Sediment will be pumped from appropriate borrow area locations specific to each island and conveyed to the restoration sites through temporary pipeline corridors. The restoration methods proposed here are established methods for this type of restoration activity.

Restoration at Louisiana Outer Coast Restoration locations has a history of support and project development; NRDA funding is necessary, however, for construction at these locations to move forward. Construction of the Caillou Lake Headlands was the selected restoration alternative for that location in the Terrebonne Basin Barrier Shoreline Restoration (TBBSR) Integrated Feasibility Study and Final Environmental Impact Statement (USACE 2010). The Chenier Ronquille barrier island restoration was authorized in 2010 as a candidate project under the 1990 Coastal Wetland Planning, Protection and Restoration Act (CWPPRA) and received design phase funding under CWPPRA. Plans and proposals to restore Shell Island have been developed in multiple documents since 1998 (LCWCRTF and WCRA 1998), including the Barataria Basin Barrier Shoreline Restoration Project (Thomson et al. 2008). Caillou Lake Headlands, Chenier Ronquille, and Shell Island are included in Louisiana's Master Plan (CPRA 2012). North Breton Island, part of the Breton National Wildlife Refuge (Breton NWR), is recognized as an important bird area due to the resources it provides to birds. However, erosion from storms constitutes a major and ongoing threat to the island, its habitats, and the breeding bird colonies it supports (Barrier Island Comprehensive Monitoring Program 2006; Lavoie 2009). Several alternatives to restore North Breton Island have been discussed, including those evaluated as part of the Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan Final Feasibility Report (USFWS 2012).

More detailed descriptions of proposed restoration activities at each of the four island locations, including the anticipated spatial extent of the different habitat types, are provided below:

Caillou Lake Headlands Barrier Island Restoration

Restoration of beach, dune, and back-barrier marsh habitats at the Caillou Lake Headlands location would occur on Whiskey Island, a barrier island in the Isle Dernieres reach of the Terrebonne Basin barrier system. Louisiana would be the lead Trustee for the design and construction of this project, working cooperatively with NOAA and DOI. The project was federally authorized under the Water Resources Development Act of 2007 and selected as a preferred alternative in the TBBSR Integrated Feasibility Study and Final Environmental Impact Statement (USACE 2010), and included in the state's Master Plan (CPRA 2012).

The Isle Dernieres chain of barrier islands has undergone significant fragmentation and reduction in size because of natural processes and human activities. Based on data from historical maps, satellite imagery, and aerial photography, long-term shoreline retreat rates at Whiskey Island have been estimated to be about 57 feet/year (Martinez et al. 2009). To slow these loss rates, portions of Whiskey Island have been restored over the past 15 years using funds received through CWPPRA (LCWCRTF 2002, 2010). This NRDA-funded project would continue restoration work on Whiskey Island and include the reestablishment of a beach and dune platform along the length of the shoreline and the construction of a marsh platform along the western end of the island on the landward side of the dune.

Restoration at this location would require approximately 8.9 million cubic yards (CY) of beach/dune fill (i.e., sand-sized sediments) that would be pumped through temporary pipeline corridors to the project site from an offshore borrow area at Ship Shoal (Figure 9-2). The dune would be constructed to an elevation of approximately +6.4 feet NAVD 88. The slopes of the beach and dune would be set at 60:1 and 30:1 (horizontal to vertical), respectively. Sand fencing would be installed to trap and retain wind-blown sediments and help foster dune development.

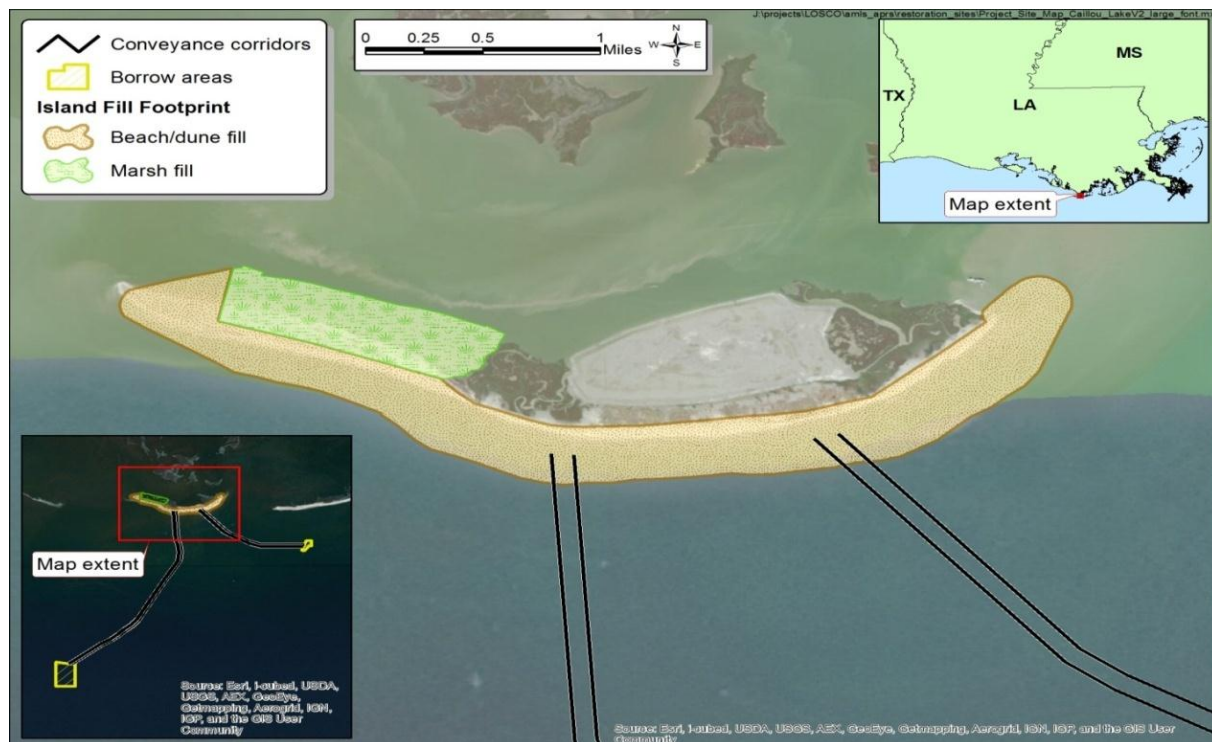


Figure 9-2. Conceptual design for Caillou Lake Headlands Barrier Island Restoration. Marsh and beach/dune fill areas are approximate. Imagery of Whiskey Island is from 2010.

Restoration at this location would also require approximately 1 million CY of marsh fill (i.e., mixed sand-, silt-, and clay-sized sediments) that would be pumped through temporary pipeline corridors from a nearshore borrow area to the project site (Figure 9-2). This marsh fill is proposed for the landward side of the dune at an elevation of +2.4 feet NAVD88. The dune platform and other supratidal areas as well as the back-barrier marsh would be planted with the appropriate native species by seeding and/or installing approved nursery stock. The containment dikes, which help retain hydraulically dredged sediments while the platform undergoes compaction and dewatering, would be breached and/or degraded within the first few years to allow for tidal exchange with the created marsh and to prevent ponding of water within the containment area.

Approximately 1,000 acres of barrier island habitat, including beaches, dunes, and back-barrier marsh, would be constructed. The project was designed to avoid disturbing approximately 286 acres of existing mangroves on the island to minimize the ecological impact during construction. The estimated cost for the restoration work at the Caillou Lake Headlands location is approximately \$110 million.

Chenier Ronquille Barrier Island Restoration

Chenier Ronquille is located along the Plaquemines/Barataria Bay barrier shoreline, eight miles east of Grand Isle. Chenier Ronquille serves as the western anchor of the Plaquemines/Barataria shoreline and forms the eastern boundary of Quatre Bayou Pass (Figure 9-3). NOAA would be the lead Trustee for the design and construction of this project, working cooperatively with Louisiana and DOI. The Chenier Ronquille barrier island restoration was authorized in 2010 as a candidate project under CWPPRA. Although it received design phase funding, it did not receive construction funding under CWPPRA. Chenier Ronquille barrier island restoration is also included in the state's Master Plan (CPRA 2012).

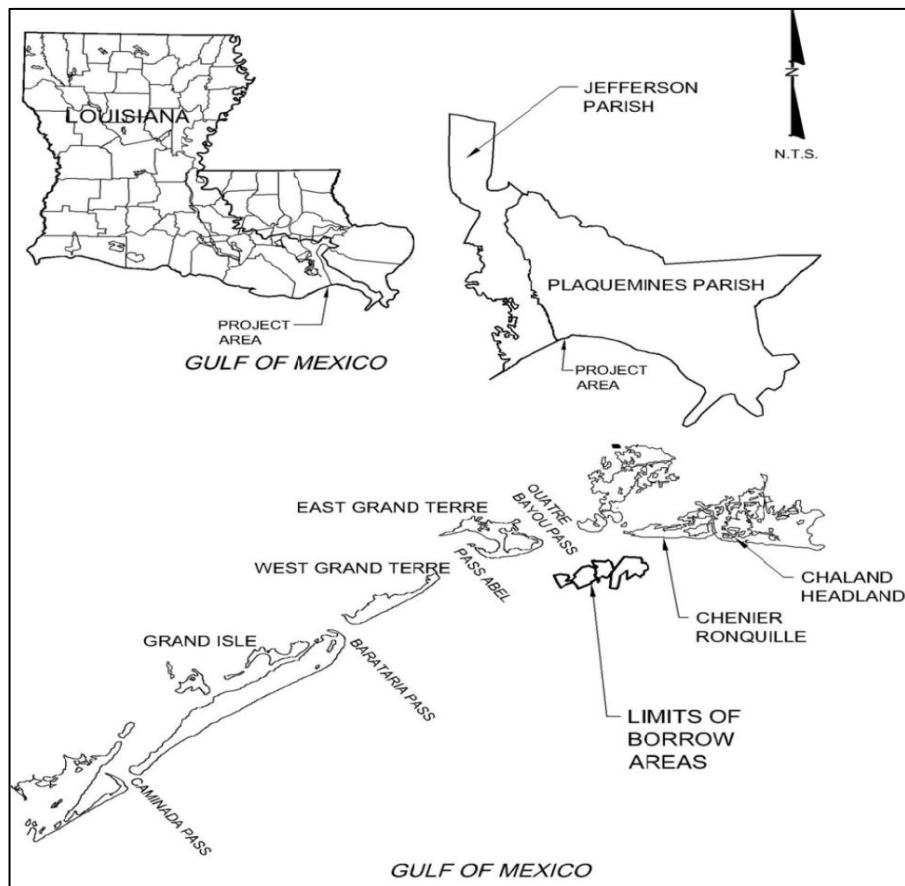


Figure 9-3. Location of Chenier Ronquille Barrier Island and proposed borrow areas. Source: Thomson et al. 2011.

Chenier Ronquille Island suffers some of the highest shoreline retreat rates in the nation. Recent shoreline change measurements suggest an average shoreline retreat rate of approximately 44 feet/year, although retreat rates of 108 feet/year have been measured. The barrier island has been breached, which is increasing the shoreline retreat rate of the island (Thomson et al. 2011). This project aims to increase island longevity by restoring beach, dune, and back-barrier marsh habitats. Restoration work would repair the breaches in the shoreline and prevent the creation of new breaches over the project life, while reestablishing dune and marsh platforms. The Chenier Ronquille restoration would tie

into two recently constructed projects to the east and restore one of the remaining reaches of the Plaquemines/Barataria shoreline.

Restoration at this location would require the excavation of approximately 2.0 million CY of beach/dune fill. The dune would be constructed with a dune crest at +8 feet NAVD88. Sand fencing would be installed to trap and retain wind-blown sediments and help foster dune development. Restoration at this location would also require excavation of approximately 2.4 million CY of marsh fill for the back-barrier marsh (using a design elevation of +2.5 feet NAVD88 and 240,000 CY of fill for the primary dikes and access channels. The beach and marsh fill borrow areas are located approximately 1.7 to 2.8 miles southwest of the project area and were initially developed for the now-completed East Grand Terre Island and Chaland Headland Restoration Projects.

Sediment for this project would be pumped through temporary pipeline corridors from the borrow areas to the restoration site. Dune and back-barrier marsh areas would be planted with the appropriate native species by seeding and/or installing approved nursery stock. The containment dikes, which help retain hydraulically dredged sediments while the platform undergoes compaction and dewatering, would be breached and/or degraded within the first few years to allow for tidal exchange with the created marsh and to prevent ponding of water within the containment area. The conceptual design for Chenier Ronquille Barrier Island Restoration is shown in Figure 9-4.

Approximately 500 acres of barrier island habitat, including beaches, dunes, and back-barrier marsh, would be constructed. The estimated cost for the restoration work at the Chenier Ronquille location is approximately \$35 million.

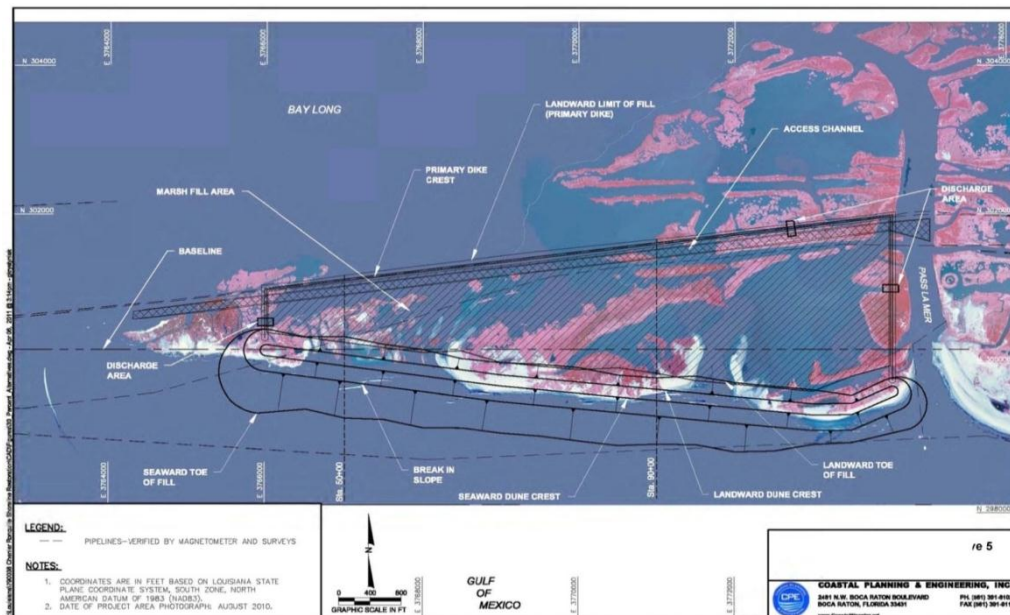
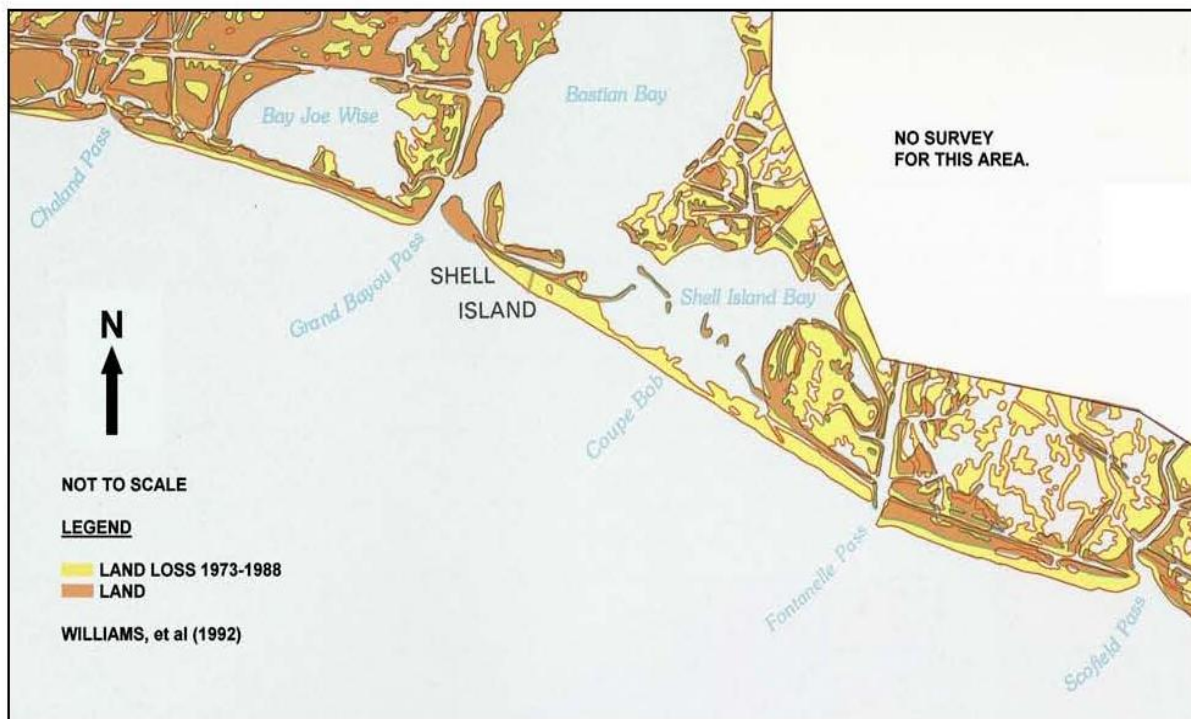


Figure 9-4. Conceptual design for Chenier Ronquille Barrier Island Restoration. Source: Thomson et al. 2011.

Shell Island (East and West Lobes) Barrier Island Restoration

Shell Island (East and West Lobes) is located approximately 49 miles south-southeast of New Orleans, along the southern margin of the Barataria Basin in Plaquemines Parish. It comprises a portion of the Plaquemines barrier shoreline (Figure 9-5). Plans and proposals to restore Shell Island have been developed in multiple documents, including Coast 2050: Toward a Sustainable Coastal Louisiana (LCWCRTF and WCRA 1998), the Barataria Basin Barrier Shoreline Restoration Project (USACE 2012), and the state's Master Plan (CPRA 2012). Louisiana would be the lead Trustee for the design and construction of this project, working cooperatively with NOAA and DOI.



Source: Thomson et al., 2008.

Figure 9-5. Shoreline change of Shell Island between 1973 and 1988.

Shell Island was originally a single barrier island spit, but the passage of Hurricane Bob in 1979 breached the center of the island, resulting in its fragmentation into a series of smaller islands, referred to as Shell Island East and Shell Island West (Thomson et al. 2008; Figure 9-5). Shell Island East has continued to disintegrate and includes several smaller islands. Shell Island West has continued to undergo shoreline retreat and migration to the west (Thomson et al. 2008).

Based on shoreline change analysis, the short-term shoreline retreat rates of Shell Island have been estimated at approximately 157 feet/year (Martinez et al. 2009). This project aims to increase island longevity by restoring beach, dune, and back-barrier marsh habitats on Shell Island West and the western portion of Shell Island East. Restoration work would repair breaches in the shoreline, reestablish a primary dune along the length of the shoreline, and construct a back-barrier marsh

platform. In addition to this proposed NRDA Early Restoration work, another restoration project, the “Shell Island East Berm Barrier Island Restoration Project (BA-110)” (Figure 9-6), was constructed in 2013 using other sources of funding.

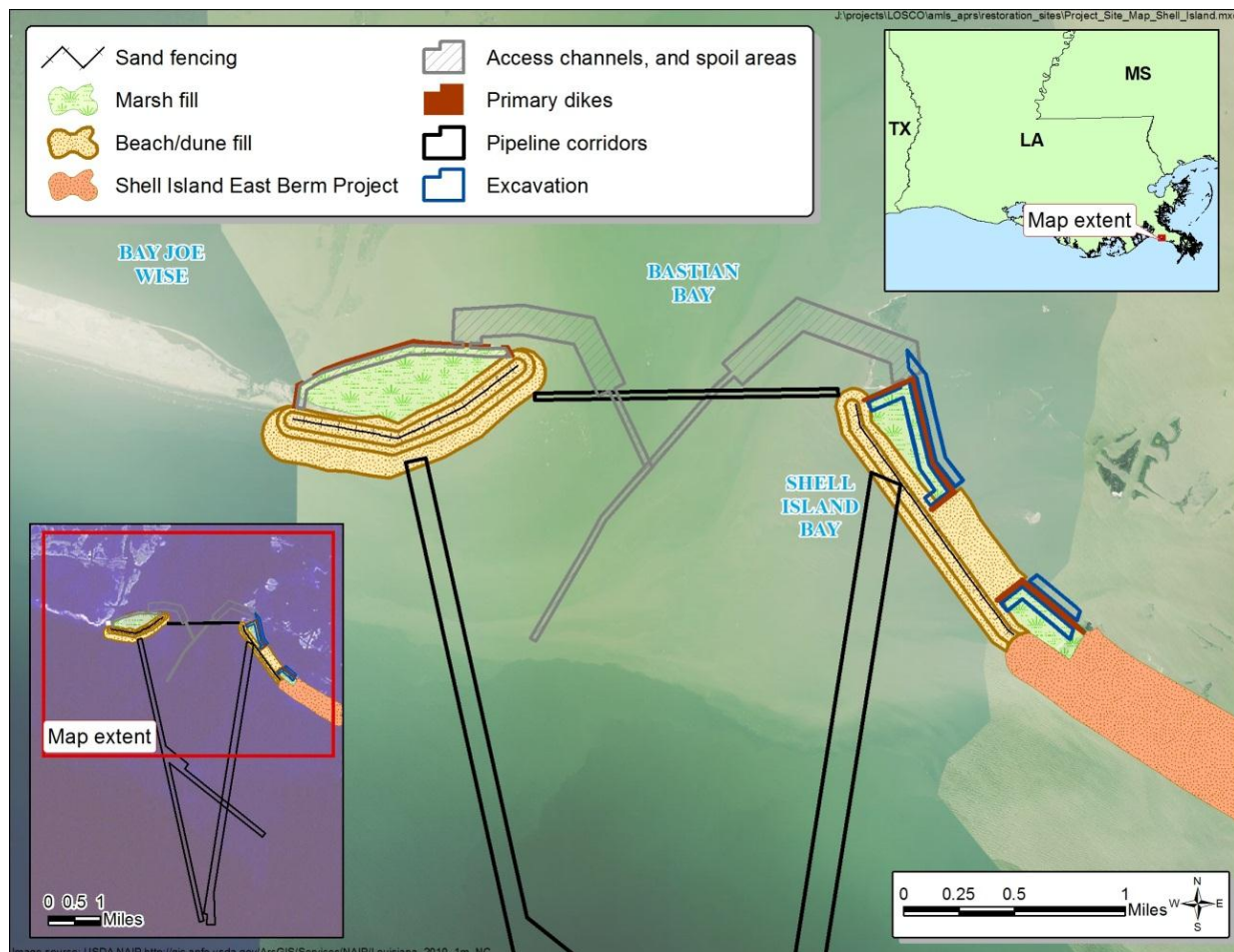


Figure 9-6. Conceptual design for Shell Island (East and West Lobes) Barrier Island Restoration. Access channel and spoil areas include excavation and disposal areas. The Shell Island East Berm Barrier Island Restoration Project (BA-110) is constructed.

The proposed NRDA restoration at this location would require approximately 4.5 million CY of beach/dune fill, including approximately 2.2 million CY for Shell Island East Lobe and approximately 2.3 million CY of beach/dune fill for Shell Island West Lobe. The beach/dune fill borrow site options in the Mississippi River have been identified and the sediment would be pumped through a pipeline along a conveyance corridor on the Empire waterway permitted for the Scofield Island Restoration Project (BA-40; LCWCRTF 2012). The dune would be constructed to an elevation of approximately +8.0 feet NAVD 88. Sand fencing would be installed to trap and retain wind-blown sediments and help foster dune development. Restoration at this location would also require approximately 1.9 million CY of marsh fill, including approximately 1.1 million CY of marsh fill for Shell Island East and approximately 0.8 million CY of marsh fill for Shell Island West. The marsh fill borrow site has been identified south of the project site in Louisiana state waters of the Gulf of Mexico, and sediment would be pumped through the temporary

conveyance pipeline within permitted corridors to the restoration site. The marsh would be located on the landward side of the dune and would be constructed to +2.5 feet NAVD 88. Beach/dune and back-barrier marsh areas would be planted with the appropriate native species by installing approved nursery stock. The containment dikes, which help retain hydraulically dredged sediments while the platform undergoes compaction and dewatering, would be breached and/or degraded within the first few years to allow for tidal exchange with the created marsh and to prevent ponding of water within the containment area. The conceptual design for Shell Island (East and West Lobes) Barrier Island Restoration is shown in Figure 9-6.

Approximately 680 acres of barrier island habitat, including beaches, dunes, and back-barrier marsh, would be constructed. The estimated cost for the restoration work at the Shell Island (East and West Lobes) location is approximately \$101 million.

North Breton Island Barrier Island Restoration

North Breton Island, located at the southern end of the Chandeleur Island chain in Louisiana, is part of the Breton NWR established in 1904 by Theodore Roosevelt. Breton NWR is recognized by the National Audubon Society as a globally important bird area because of the resources it provides to birds. North Breton Island hosts one of Louisiana's largest historical brown pelican nesting colonies. However, surveys by Breton NWR staff indicate that this colony has declined from over 15,000 pairs before 1998 to fewer than several thousand pairs in 2012, including a reduction of approximately 50% of breeding pelicans between 2008 and 2012. Erosion from tides and storms constitutes a major and ongoing threat to North Breton Island, its habitats, and the breeding bird colonies it supports (Lavoie 2009; Martinez *et al.* 2009; Kindinger *et al.* 2013). Without actions to restore sand into the North Breton Island system, the island is expected to be completely submerged sometime between 2013 and 2037, depending on the frequency and magnitude of future storms (Lavoie 2009). This project aims to increase island longevity by restoring beach, dune, and back-barrier marsh habitats on the island, providing nesting and foraging habitat for brown pelicans, terns, skimmers and gulls injured by the Spill. Restoration work would reestablish a dune platform along the length of the shoreline and construct a marsh platform on the landward side of the dune.

North Breton Island restoration will be guided by the data analyses presented in Lavoie (2009), Visser *et al.* (2005), Hingtgen *et al.* (1985), and other related documents. Commissioned by the USFWS, Lavoie (2009) represents the latest and most comprehensive investigation of sand resources, physical and environmental factors, and feasibility of restoration of the Chandeleur Islands. As recommended by Lavoie (2009), restoration would be designed to mimic the natural processes of barrier island evolution, including erosion and longshore transport of sand. Work would reestablish a dune platform along the length of the shoreline and construct a marsh platform on the landward side of the dune. The conceptual design for the placement of sand and back-barrier marsh sediment (Figure 9-7) mimics the pre-Hurricane Katrina island coverage and expected island evolution pattern. DOI would be the lead Trustee for the design and construction of this project, working cooperatively with Louisiana and NOAA.



Figure 9-7. Conceptual design for North Breton Island Restoration.

Restoration at this location would use approximately 3.7 million CY of sand, silt, and clay sized material dredged from one or more borrow sites within a nearby source area and placed on the existing island platform to create the desired island configuration. Preliminary review of oil and gas pipeline infrastructure and available geotechnical data suggests that a nearby shoal complex (Figure 9-8) has the potential for providing an appropriate and cost efficient sediment source for the proposed restoration. Geophysical and geotechnical surveys conducted as part of project engineering and design will help delineate specific borrow sites within the shoal complex for acquiring sand-sized sediments for dune and beach restoration and finer mixed sand-silt-clay sized sediments for back-barrier marsh restoration.

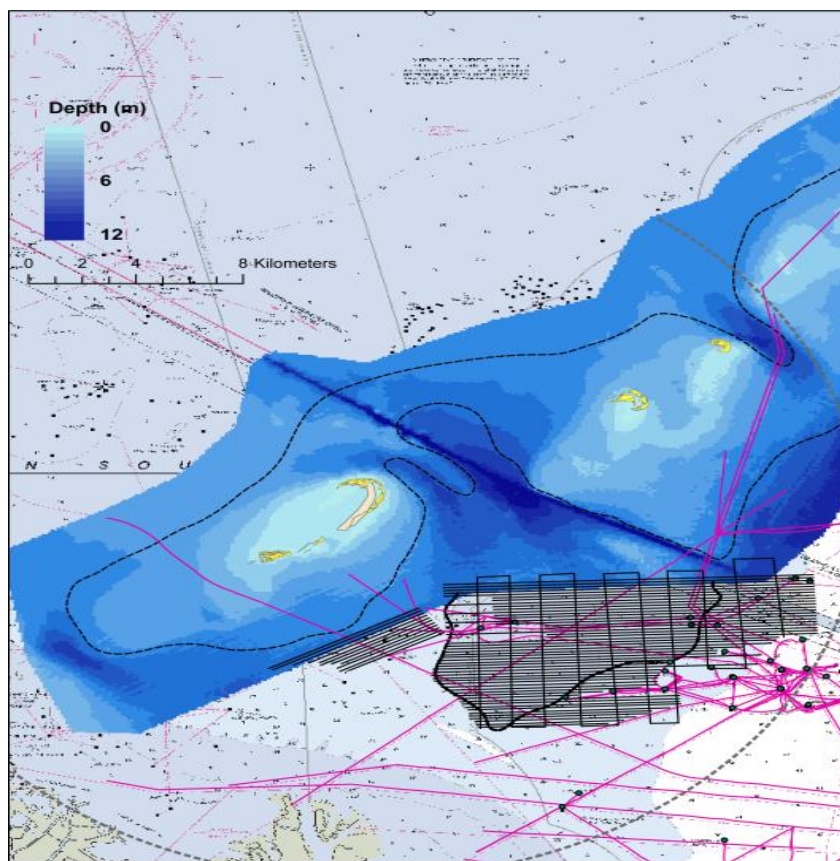


Figure 9-8. Proposed North Breton Island restoration borrow area (black hatch lines). Pipeline infrastructure designated with pink lines.

The restoration design is expected to include: a dune platform with a crest elevation of approximately 8–10 feet above mean sea level (optimum elevation to be determined); a gulf side beach that is approximately 200-feet wide and constructed to an elevation of approximately 3 feet above mean sea level; and a sound side back-barrier marsh platform that is approximately 500-feet wide and constructed to an elevation of approximately 3 feet above mean sea level. Sand fencing would be installed to trap and retain wind-blown sediments and build dune habitats. Sediment would be pumped through temporary pipeline corridors from the borrow site(s) to the restoration site. Dune and back-barrier marsh areas would be planted with the appropriate native species by seeding and/or installing approved nursery stock. The containment dikes, which help retain hydraulically dredged sediments while the platform undergoes compaction and dewatering, would be breached and/or degraded within the first few years to allow for tidal exchange with the created marsh and to prevent ponding of water within the containment area.

Initial designs for the island suggest that more than 300 acres of barrier island habitat, including beaches, dunes, and back-barrier marsh, would be constructed. The estimated cost for the restoration work at the Breton Island location is approximately \$72 million.

9.2.3 Evaluation Criteria

The Trustees evaluated the Louisiana Outer Coast Restoration project based on the evaluation criteria described in Chapter 2 and the additional RRP Program-specific criteria described in the introduction to this chapter. First, the proposed restoration has a clear nexus to resources injured by the Spill. See 15 C.F.R. § 990.54 (a)(2); and 6(a)-(c) of the Framework Agreement. Louisiana's barrier islands, especially the islands located in the Barataria Hydrologic Basin, were heavily impacted by the Spill. Numerous dead and oiled brown pelicans, terns, skimmers, and gulls were collected during and following the Spill. The ecological resources and services that would be gained by this restoration are anticipated to help compensate the public for Spill-related injuries to beach/dune and back-barrier marsh in Louisiana, as well as for injuries to brown pelicans, terns, skimmers, and gulls. The project, thus, also benefits more than one resource and/or service. See 15 C.F.R. § 990.54 (a)(5).

Project restoration designs are technically feasible and based on proven techniques and established methods used in other Louisiana barrier island restoration projects. See 15 C.F.R. § 990.54 (a)(3); and 6(e) of the Framework Agreement. The proposed restoration has a high likelihood of success given the use of established methods and construction techniques designed to facilitate natural processes supporting barrier island habitats. USGS (2013) noted that renourishment is a cost-effective method for increasing the longevity of Louisiana's barrier islands. Also, restoration would be conducted at a reasonable cost for this type of action, and could be expected to be implemented with minimal delay given the previous planning already completed. See 15 C.F.R. § 990.54 (a)(1); RRP Program FPEIS (NOAA et al. 2007b, p. 104); and 6(e) of the Framework Agreement. In addition, several of the components of Louisiana Outer Coast Restoration have already been publicly vetted through CWPPRA, Louisiana Coastal Area – Ecosystem Restoration (LCA), and/or Louisiana's Master Plan development processes. Proposed restoration supports existing restoration strategies and is consistent with anticipated long-term restoration needs and the Gulf Coast Ecosystem Restoration Task Force recommendations (GCERTF 2011). See RRP Program FPEIS (NOAA et al. 2007b, p.104); and 6(d) of the Framework Agreement. Finally, the high rates of shoreline retreat and land loss on these islands indicate that there is an urgency to complete these projects. See RRP Program FPEIS (NOAA et al. 2007b, p.104). Proposals to conduct restoration activities at these islands were submitted to the Trustees as part of the Trustees' Early Restoration project solicitation process.

9.2.4 Performance Criteria, Monitoring, and Maintenance

Construction monitoring would be done before, during, and in a subsequent period following construction to ensure that project designs are correctly implemented. The performance of Louisiana Outer Coast Restoration would be assessed using both qualitative and quantitative performance standards related to the project goals and objectives that would facilitate evaluation of project performance over time and the potential need for corrective actions. Successful implementation of this project would be measured by the performance of restored barrier island habitat, as well as the presence of various species of nesting birds (e.g., brown pelicans, terns, skimmers, and gulls) within restored habitat areas. Examples of potential performance monitoring activities for this project include, but are not necessarily limited to, nest and/or bird surveys, vegetation and ground surveys, and periodic collection of remote sensing data (e.g., color-infrared aerial photography and Light Detection and

Ranging (LIDAR)). Additional details concerning the performance measures and monitoring for this project would be developed before implementation in accordance with the OPA regulations (15 C.F.R. § 990.55 (b)(3)).

9.2.5 Offsets

For purposes of negotiating Offsets with BP in accordance with the Framework Agreement, the Trustees used a Habitat Equivalency Analysis and Resource Equivalency Analysis to estimate habitat and bird Offsets, respectively. Habitat Offsets (expressed in DSAYs) were estimated for a portion of the back-barrier marsh and beach/dune acreage that would be created by this restoration, based on the expected extent and function of the newly created barrier island habitats. Bird Offsets were estimated for a separate portion of the created area by calculating additional pelican, tern/skimmer and gull productivity expected in certain areas over time compared to a no-action scenario.



Photo credit: Brian Spears, USFWS.

Figure 9-9. Nesting brown pelicans, North Breton Island.

The Trustees and BP agreed that if this restoration is selected for implementation, BP would receive Offsets of 2,576 DSAYs of back-barrier marsh habitat and 3,820 DSAYs of beach/dune habitat, applicable to back-barrier marsh and beach/dune habitat injuries in Louisiana, as determined by the Trustees' total assessment of injury for the Spill.

The Trustees and BP further agreed that if this restoration is selected for implementation, BP would receive Offsets of 11,000 discounted pelican fledglings, 28,000 discounted tern and skimmer fledglings, and 20,000 discounted gull fledglings. The unit of "discounted fledglings" uses a discounting rate to convert the number of fledglings expected to be produced each year to a common base year for comparison. Discounted pelican, tern/skimmer and gull fledgling Offsets were estimated because these species, in particular, are expected to benefit from the proposed restoration actions. Several life history, project, and local stochastic factors were used to develop bird Offsets, including nest densities, fledglings per nest, longevity of the project, influence of storms on nesting success, and the spatial

extent expected to be utilized for nesting. If Louisiana Outer Coast Restoration is selected for implementation, these Offsets will be used against BP's liability for injuries to these bird species, as determined by the Trustees' total assessment of injury for the Spill.

The Trustees further recognize that barrier islands provide important habitat for fish, shellfish, and other aquatic species that utilize estuaries during their lifecycles, including fish and shellfish that use back-barrier marsh as nurseries as juveniles before they migrate out to open water (Condrey et al. 1996; O'Connell et al. 2005). The Trustees have agreed with BP that additional Offsets for aquatic biomass will be provided to BP for this restoration *only* if back-barrier marsh habitat Offsets provided in exchange for funding this restoration exceed the calculated injury to Louisiana back-barrier marsh habitat, as determined by the Trustees' total assessment of injury for the Spill. Because the Trustees have not yet completed their assessment of injury, neither the Trustees nor BP know whether the proposed habitat Offsets will exceed this injury. If the Offsets do exceed the injury, the "excess" Offsets would be applied to offset injuries to aquatic organisms that were injured in offshore waters of the Gulf of Mexico but are estuarine-dependent at some point in their lifecycle. Offsets for estuarine-dependent aquatic biomass injuries would be applied at a rate of 1,000 discounted kilogram years per DSAY. This value was negotiated with BP for purposes of advancing this project in Early Restoration based on the Trustees' review of published literature on the productivity of marsh (primary, secondary and tertiary) and the trophic transfer of estuarine-dependent aquatic biomass per acre of marsh, and then standardized in units of "secondary productivity." The Trustees have further specified that this Offset – if utilized – would apply only to estuarine-dependent aquatic biomass injuries in Louisiana and federal waters of the Continental Shelf; it would not apply to aquatic biomass injuries in waters of Texas, Mississippi, Alabama, or Florida.

9.2.6 Cost

The total estimated cost to implement Louisiana Outer Coast Restoration is \$318,363,000. This cost reflects current cost estimates developed from the most current designs for each island available to the Trustees at the time of the project negotiation. The cost includes provisions for planning, engineering and design, construction, monitoring, and potential contingencies.

9.2.7 Summary and Next Steps

Per the Purpose and Need of the Draft Phase III ERP/PEIS, four alternatives are considered, including a no action (Alternative 1), selection of project types emphasizing habitat and living coastal and marine resources (Alternative 2), project types emphasizing recreational opportunities (Alternative 3), or a combination of both habitat and living coastal and marine resources and recreational opportunities (Alternative 4). As proposed, the Louisiana Outer Coast Restoration implements restoration techniques within Alternatives 2 and 4.

The proposed Louisiana Outer Coast Restoration would restore beach, dune, and back-barrier marsh habitats at four barrier island locations in Louisiana. From west to east, the four locations are Caillou Lake Headlands (also known as Whiskey Island), Chenier Ronquille, Shell Island (West Lobe and portions of East Lobe), and North Breton Island. Approximately 2,480 acres of barrier island habitat, including beaches, dunes, and back-barrier marsh, would be constructed. The project is consistent with

Alternative 2 (Contribute to Restoring Habitats and Living Coastal and Marine Resources) and Alternative 4 (Preferred Alternative).

Sections 9.3 – 9.6 provide the environmental review for the 4 barrier island locations.

9.2.8 References

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9.3 Louisiana Outer Coast Restoration: Environmental Review A (Caillou Lake Headlands)

DOI has independently evaluated the Louisiana Coastal Area (LCA) Integrated Feasibility Study and Final Environmental Impact Statement (EIS) for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010) and finds that it complies with CEQ and DOI requirements for adopting NEPA analyses prepared by other agencies (See Section 7.8 for information on DOI NEPA adoption regulations and criteria). This document can be found in its entirety at (<http://losco-dwh.com>).

Accordingly, DOI intends to adopt the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration to fulfill DOI's NEPA requirements for analysis of the Caillou Lake Headlands restoration location of the Louisiana Outer Coast Restoration project. Below is a brief summary of the portions of the LCA EIS that are relevant to this proposed project.

9.3.1 Proposed Action

Restoration at the Caillou Lake Headlands location would occur on Whiskey Island, a barrier island in the Isle Dernieres reach of the Terrebonne Basin barrier shoreline (Figure 9-10). Construction of Whiskey Island would utilize hydraulically dredged sediments to create beach, dune, and back-barrier marsh habitats. The back-barrier marsh platform would be constructed to an elevation of +2.4 ft. NAVD88. Construction of containment dikes using in-situ material would be required for the back-barrier marsh platform to retain hydraulically dredged sediments while the platform undergoes compaction and dewatering. Containment dikes are expected to degrade naturally over time. If necessary, dikes would be gapped after a period of time to allow hydrologic connection to the bay and to prevent ponding of water within the containment area. The dune platform would be constructed to an elevation of approximately +6.4 ft. NAVD88, and sand fencing would be erected to capture windblown sand and foster dune development. The dune platform and other supratidal areas would be planted with native vegetation shortly after construction. The back-barrier marsh platform would be planted after a period of compaction and dewatering has occurred and the platform is stable enough for planting activities.

9.3.2 Background

Plans and proposals to restore Whiskey Island have been developed over time in multiple documents, including Coast 2050: Toward a Sustainable Coastal Louisiana (LCWCRTF and WCRA 1998), the LCA Ecosystem Restoration Study (USACE 2004a), and the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010).

The LCA Ecosystem Restoration Study (USACE 2004a) recommended the Terrebonne Basin Barrier Shoreline Restoration as a near-term critical restoration feature for further study. The restoration of the Timbalier and Isles Dernieres barrier island chains (including Whiskey Island) was specifically proposed as part of the Terrebonne Basin Barrier Shoreline Restoration plan. General information on the need for this project type, the affected environment, and the environmental consequences were presented in the Final Programmatic EIS for the Louisiana Coastal Area (LCA) Ecosystem Restoration Study (USACE 2004b).

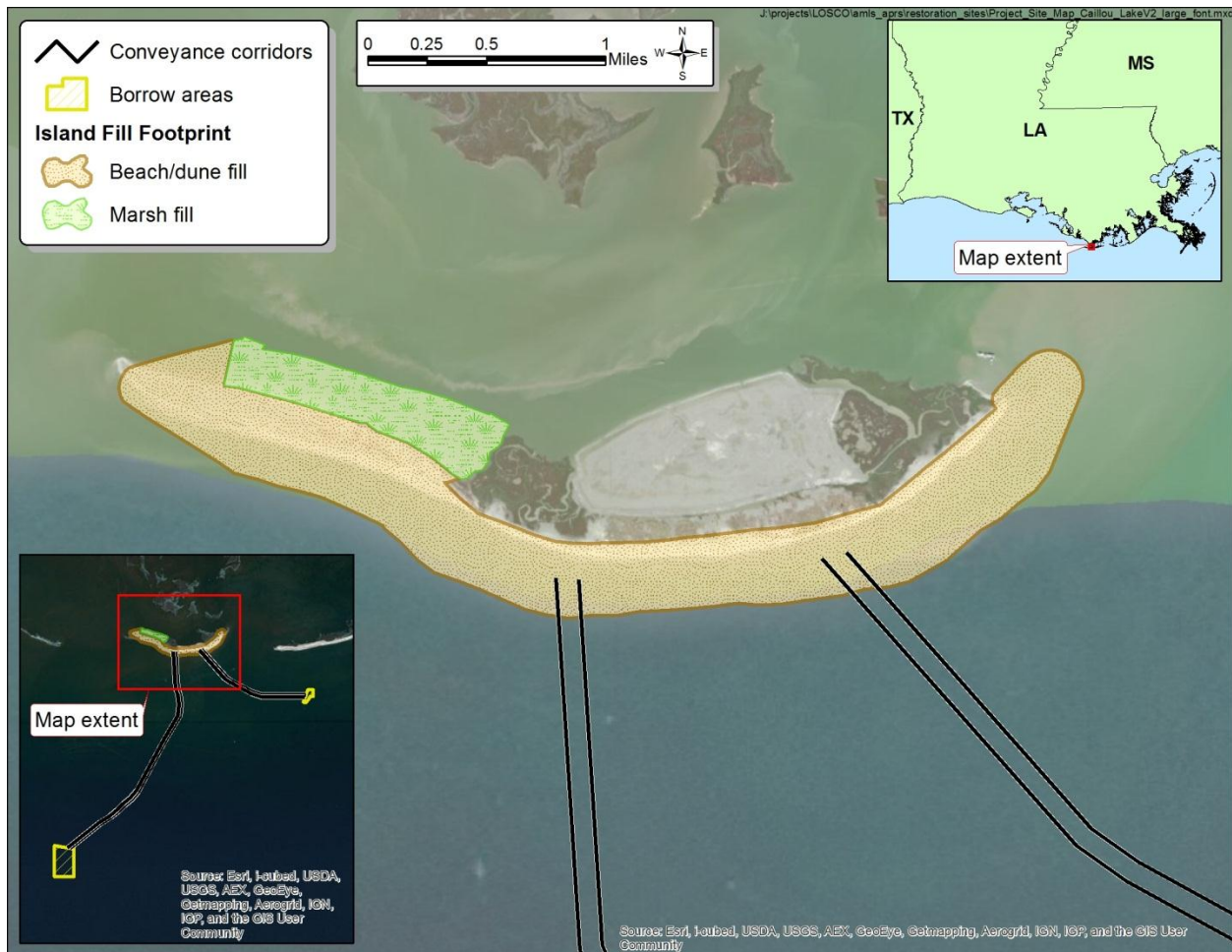


Figure 9-10. Conceptual design for Caillou Lake Headlands Barrier Island Restoration. Back-barrier marsh and beach/dune fill areas are approximate. High-resolution imagery of Whiskey Island is from 2010.

A more detailed evaluation of the alternatives and environmental consequences for the Terrebonne Basin Barrier Shoreline Restoration project was presented in the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010). The potential environmental consequences for implementing five alternatives, compared to the no action alternative, were considered (USACE 2010). The five alternatives that were evaluated include: Alternative 2 (Timbalier Island Plan E); Alternative 3 (Whiskey Island Plan C and Timbalier Island Plan E); Alternative 4 (Whiskey Island Plan C, Trinity Island Plan C, and Timbalier Island Plan E); Alternative 5 (Whiskey Plan C, Raccoon Island Plan E with a terminal groin, Trinity Island Plan C, and Timbalier Plan E); and Alternative Plan 11 (Whiskey Plan C). The impact analysis was based on a combination of scientific and engineering analyses, professional judgment, and previously compiled information (USACE 2010).

Under the proposed National Ecosystem Restoration (NER) Plan (Alternative 5), short-term impacts are anticipated as a result of the dredging and placement of borrow material during the construction activities, and include impacts to the existing vegetated and non-vegetated habitat, impacts to water

quality (e.g., turbidity), the disruption or displacement of wildlife and fisheries, and injury to sessile or slow moving organisms. Short-term increases in the noise level and impacts to air quality (e.g., emissions), navigation, commercial fisheries, and recreational activities are also anticipated as a result of the construction activities. In addition, the Gulf of Mexico water bottoms would be impacted from the removal of sand resources from the borrow site. Over the long-term, project implementation would result in the restoration of beach, dune, and back-barrier marsh habitat, and would provide important and essential habitats used by fish and wildlife for spawning, nursery, nesting, feeding, and cover. Indirect benefits to commercial and recreational activities are expected by protecting, creating, and restoring important and essential fish and wildlife habitats. This Final EIS also provides information on measures that should be taken to avoid and minimize potential adverse impacts to existing resources, such as threatened and endangered species.

The Caillou Lake Headlands proposed action is based on the preferred alternative for the restoration of Whiskey Island (Whiskey Island Plan C) within the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration. The proposed action is expected to have either no effect or short-term adverse impacts on most of the features and resources evaluated. Temporary impacts to existing habitats, water quality (e.g., turbidity), air quality, wildlife, and fisheries, and increases in noise levels, are anticipated as a result of the construction activities. Benthic resources present within the borrow areas, in the conveyance channels that will contain dredge pipe, and at the restoration site will be disturbed during construction by excavation, fill, or the physical impact of pipe placement. Over the mid- to long-term, positive effects are anticipated as the created habitats mature and reach equilibrium. The project would provide additional beach, dune, and back-barrier marsh habitat for marine and estuarine fisheries and avian communities. Benefits to commercial and recreational resources are expected from the enhancement of fish habitat.

The Trustees propose to construct the Caillou Lake Headlands Restoration Project (TE-100; Figure 9-10). This proposed project would continue restoration work on Whiskey Island, as portions of Whiskey Island have been restored during the past 15 years using funds received through the 1990 Coastal Wetland Planning, Protection and Restoration Act (CWPPRA) (LCWCRTF 2002; LCWCRTF 2010).

9.3.3 Alternatives Analysis

In the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010), a total of fourteen alternatives, including the no action alternative, were considered for evaluation. These alternatives consisted of different restoration scenarios for the Terrebonne Basin barrier island chain. Only five of these alternatives, in addition to the no action alternative, were carried forward for a detailed evaluation of environmental consequences. Based on an analysis of habitat benefits and cost-effectiveness, Alternative 5 (including Whiskey Island Plan C, Raccoon Island Plan E with a terminal groin, Trinity Island Plan C, and Timbalier Island Plan E), was selected as the NER Plan. Under Whiskey Island Plan C, Whiskey Island would be restored to its minimal design plan with 5 years of advanced fill. The project layout for Whiskey Island Plan C was designed to avoid disturbing approximately 286 acres of existing mangroves on the island to minimize the ecological impact during construction (USACE 2010).

The proposed Caillou Lake Headlands restoration location of the Louisiana Outer Coast Restoration project is based on the Whiskey Island Plan C.

9.3.4 Findings

9.3.4.1 Summary

The LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010) provides the supporting analysis to determine whether the Caillou Lake Headlands Restoration is likely to result in significant impacts to the quality of the human environment. As stated in these documents, the restoration of Caillou Lake Headlands is expected to provide long-term benefits to Louisiana coastal resources without significant long-term adverse environmental impacts. Construction-related adverse impacts, such as noise, increased turbidity, increased air emissions, the placement of borrow material on existing habitat, and the displacement of wildlife and fisheries, are considered short-term and temporary. Over the long-term, project implementation would result in the restoration of beach, dune, and back-barrier marsh habitat, and would provide important and essential habitats used by fish and wildlife. Indirect benefits to commercial and recreational fisheries are expected by increasing the quantity and quality of fish habitat.

9.3.4.2 Public Input

As part of the LCA Terrebonne Basin Barrier Shoreline Restoration Feasibility Study, a Notice of “Intent To Prepare a Draft Supplemental Environmental Impact Statement” was published in the Federal Register (volume 73, number 246) on December 22, 2008. A public scoping meeting was held on February 10, 2009 in Houma, Louisiana. A total of 45 participants signed in for the scoping meeting (USACE 2010). The Supplemental EIS was released to the public in June 2010, and included a 45-day public review period. A public meeting was held during this time to solicit comments on the proposed action. Comments from the review period were incorporated into the EIS, and the Final EIS was released for a 30-day public review in October 2010 (USACE 2010).

9.3.4.3 Potential Adverse Impacts to Infrastructure

Some oil and gas pipelines are present in the vicinity of the proposed action. To minimize the potential damage to these features, the pipeline locations have been identified so they may be avoided in the implementation of the proposed action. The construction contractor would also verify the location of these features. The restoration work to create the project features on Whiskey Island will not cross pipeline infrastructure. The temporary sediment pipeline in the conveyance corridors from Ship Shoal Block 88 and Whiskey 3A borrow areas will cross existing pipelines, however impacts are not anticipated. For these reasons, adverse impacts to oil and gas infrastructure are not anticipated.

9.3.5 Additional Considerations

9.3.5.1 Cultural Resources

The analysis of cultural resources in the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010) is adequate for purposes of adoption. In addition, a complete review of this project under Section 106 of the National Historic Preservation Act would be

completed as environmental review continues. This project would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

9.3.5.2 Miscellaneous Environmental Protection Measures/Best Practices

The Trustees intend to implement a number of best practices at the Caillou Lake Headlands location to reduce the potential for adverse impacts on sensitive resources. For example, a bird monitoring and abatement plan would be implemented by the construction contractor during the project. The Contractor would be responsible for surveillance, management, and control of their construction activities to minimize interference with, disturbance to, and damage of water, fish, and wildlife resources. The Contractor shall be aware of threatened and endangered species and migratory birds, and implement practices and follow all conditions set forth by NOAA, USFWS, and the Louisiana Department of Wildlife and Fisheries (“LDWF”) to protect these resources. Additionally, section 7 consultation with USFWS will be reinitiated if necessary, to evaluate any potential impacts to the proposed red knot.

The USFWS issued a final biological opinion in 2010 for the LCA Terrebonne Basin Barrier Shoreline Restoration Project (USFWS 2010) and its effects on threatened piping plover (*Charadrius melodus*) and its designated critical habitat. The USFWS determined that the level of anticipated take is not likely to result in jeopardy to the piping plover species or destruction or adverse modification of its critical habitat. Following implementation, the available habitat for wintering piping plover sheltering and foraging will be increased significantly, to the direct benefit of the species. Recent research has reinforced the importance of long-term maintenance of overwash features to support the piping plover population (Schupp *et al.* 2012).

Currently, no Bald eagles are known to nest near the project area. However, all conservation measures to avoid disturbance to Bald eagles would be implemented, if any nests were observed.

Migratory birds are known to nest in the project area. Virtual buffers would be established as follows: (1) rookeries containing brown pelicans shall have a 2,000 foot buffer; (2) rookeries containing wading birds (*e.g.*, herons, egrets, ibis) shall have a 1,000 foot buffer; and (3) rookeries containing shorebirds (*e.g.*, gulls, terns, skimmers) shall have a 650 foot buffer. When rookeries are mixed (*e.g.*, gulls and pelicans), buffers for the most sensitive species shall be observed.

In addition, the Trustees intend to implement NOAA’s Measures for Reducing Entrapment Risk to Protected Species, revised on May 22, 2012 (NOAA 2012). These measures are included below:

Pre-construction Planning

During project design, the project proponents will incorporate at least one escape route into the proposed retention structure(s) to allow any protected species to exit the area(s) to be enclosed. Escape routes must lead directly to open water outside the construction site and must have a minimum width of 100 feet. Escape routes should also have a depth as deep as the deepest natural entrance into the enclosure site and must remain open until a thorough survey of the area, conducted immediately prior to complete enclosure, determines no protected species are present within the confines of the structure.

Pre-construction Compliance Meeting

Prior to construction, project proponents, the contracting officer representative, and construction personnel should conduct a site visit and meeting to develop a project-specific approach to implementing these preventative measures.

Responsible Parties

The project proponents will instruct all personnel associated with the project of the potential presence of protected species in the area and the need to prevent entrapment of these animals. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing protected species. Construction personnel will be held responsible for any protected species harassed or killed as a result of construction activities. All costs associated with monitoring and final clearance surveys will be the responsibility of project proponents and will be incorporated in the construction plan.

Monitoring During Retention Structure Construction

It is the responsibility of construction personnel to monitor the area for protected species during dike or levee construction. If protected species are regularly sighted over a 2 or 3 day period within the enclosure area during retention structure assembly, construction personnel must notify the project proponent. It is the responsibility of the project proponent to then coordinate with the National Marine Fisheries Service ("NMFS") Marine Mammal Health and Stranding Response team (1-877-WHALE HELP [1-877-942-5343]) or the appropriate State Coordinator for the Sea Turtle Stranding and Salvage Network (see http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm) to determine what further actions may be required. Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area.

Pre-closure Final Clearance

Prior to completing any retention structure by closing the escape route, the project proponent will ensure that the area to be enclosed is observed for protected species. Surveys must be conducted by experienced marine observers during daylight hours beginning the day prior to closure and continuing during closure. This is best accomplished by small vessel or aerial surveys with 2-3 experienced marine observers per vehicle (vessel/helicopter) scanning for protected species. Large areas (e.g. >300 acres) will likely require the use of more than one vessel or aerial survey to ensure full coverage of the area. These surveys will occur in a Beaufort sea state (BSS) of 3 feet or less (measured within the area being closed by the containment), as protected species are difficult to sight in choppy water. Escape routes may not be closed until the final clearance determines the absence of protected species within the enclosure sight.

Post closure Sightings

If protected species become entrapped in an enclosed area, the project proponent and NMFS must be immediately notified. If observers note entrapped animals are visually disturbed, stressed, or their health is compromised then the project proponent may require any pumping activity to cease and the breaching of retention structures so that the animals can either leave on their own or be moved under the direction of NMFS.

In coordination with the local stranding networks and other experts, NMFS will conduct an initial assessment to determine the number of animals, their size, age (in the case of dolphins), body condition, behavior, habitat, environmental parameters, prey availability and overall risk.

If the animal(s) is/are not in imminent danger they will need to be monitored by the Stranding Network for any significant changes in the above variables.

Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area. Coordination by the project proponent with the NMFS SER Stranding Coordinator may result in authorization for these actions.

NMFS may intervene (catch and release and/or rehabilitate) if the protected species are in a situation that is life threatening and evidence suggests the animal is unlikely to survive in its immediate surroundings.

Surveys will be conducted throughout the area at least twice or more in calm surface conditions (BSS 3 feet or less - measured within the area being closed by the containment)), with experienced marine observers, to determine whether protected species are no longer present in the area.

9.3.6 Summary and Next Steps

As discussed above, DOI intends to adopt the LCA Integrated Feasibility Study and Final EIS for the Terrebonne Basin Barrier Shoreline Restoration to fulfill DOI's NEPA requirements for analysis of the Caillou Lake Headlands restoration location of the Louisiana Outer Coast Restoration project. The Trustees will consider public comment and information relevant to environmental concerns bearing on the proposed actions or their impacts. Final determination on this project (Louisiana Outer Coast Restoration) will be included in the final Phase III ERP/PEIS and Record of Decision. This project would be implemented in accordance with all applicable laws and regulations.

9.3.7 References

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9.4 Louisiana Outer Coast Restoration Project: Environmental Review B (Chenier Ronquille Barrier Island)

DOI has independently evaluated the 2013 Environmental Assessment for the Chenier Ronquille Barrier Island Restoration Project (Chenier Ronquille EA), BA-76, prepared by NOAA (2013), and finds that it complies with CEQ and DOI requirements for adopting NEPA analyses prepared by other agencies (See Section 7.8 for information on DOI NEPA adoption regulations and criteria). The Chenier Ronquille EA and Finding of No Significant Impact can be found in their entirety at (<http://losco-dwh.com>).

This project is consistent with coastal protection programs and activities in Louisiana, including the CWPPRA program and activities pursuant to the Louisiana Coastal Area Ecosystem Restoration Study (USACE 2004). These programs and activities have undergone programmatic NEPA analysis³.

Accordingly, DOI intends to adopt the Chenier Ronquille EA to fulfill DOI's NEPA requirements for analysis of the Chenier Ronquille restoration location of the Louisiana Outer Coast Restoration project. Below is a brief summary of the portions of the Chenier Ronquille EA that are relevant to this proposed project.

9.4.1 Proposed Action

The proposed restoration on Chenier Ronquille Island would repair the breaches in the shoreline and prevent creation of new breaches over the 20-year project life, while reestablishing and increasing the island's longevity via dune and marsh creation. Additionally, the project would restore the shoreline, dune, and back-barrier marsh to increase island habitat utilized by essential fish and wildlife species both on the barrier headland and in quiescent bays.

Construction would utilize dredged sediment to create a beach, dune and marsh platform. Marsh construction would be to +2.5 ft NAVD88, because soil settlement analysis indicated this would provide the optimum number of years above mean high water (accounting for settlement of fill material, subsidence, and eustatic sea level rise) and is similar to the marsh elevation used for similar successful projects. Containment dikes would be constructed to retain delivered dredged sediment until the platform has dewatered. Containment dikes are expected to degrade through natural erosion from waves. Dikes would be gapped after settlement of marsh fill materials, if necessary, to allow hydrologic connection should the expected erosion or settlement not occur.

The dune has a constructed elevation of +8 feet, NAVD and a width of 150 feet. Dune cross-sections are designed to maintain a minimum of +5 ft NAVD88 dune height after a 10-year storm event (Thompson and others 2011). Sand fencing would be erected on the constructed dune to capture naturally windblown sand and passively build or maintain the dune feature.

After a period of settlement and salinity stabilization of placed materials, native intertidal and dune habitat species would be planted in phased events over the first 3 years. Plantings would help establish the plant community, and foster retention of placed sediments.

³ Final Programmatic Impact Statement, Louisiana Coastal Wetlands Restoration Plan (USACE 1993) and Final Programmatic Environmental Impact Statement, Louisiana Coastal Area (LCA), Louisiana, Ecosystem Restoration Study (USACE 2004).

9.4.2 The Need for the Proposed Action

This action meets the purpose and need of the Draft Phase III ERP/PEIS because it will accelerate meaningful restoration of injured natural resources and their services resulting from the Spill.

9.4.3 The Environmental Impacts of the Proposed Action

For background, note that the CWPPRA Task Force and LCWCRTF prepared a Programmatic Environmental Impact Statement (PEIS) (1993) that included information on this type of project (barrier islands). In addition, a Final Programmatic EIS prepared by the USACE as part of the Louisiana Coastal Area Ecosystem Restoration Study (USACE 2004) also includes barrier islands in their evaluation of restoration actions. This document includes background information on the goals of the CWPPRA program and coastal protection and restoration in Louisiana. The project proposed here is consistent with those CWPPRA goals. The EA specifically evaluates the significance of impacts on the quality of the human environment associated with the proposed action and design alternatives.

The Trustees intend to construct alternative 5 (hereafter: the preferred alternative) as evaluated in the Chenier Ronquille EA. The preferred alternative fulfills the project goal and objectives, while providing the lowest cost per constructed acre of the evaluated alternatives. Furthermore, no pipelines have to be crossed to construct the primary dike. It provides the largest marsh of the evaluated design alternatives, which would minimize the potential for breaching.

As discussed in the Chenier Ronquille EA, the preferred alternative is expected to provide long-term benefits to Louisiana coastal resources without significant long-term adverse environmental impacts. Construction-related adverse impacts, such as noise, increased water turbidity, and increased air emissions are considered short-term, minor and not significant because they are temporary or reversible. The EA provides information on measures that would be taken to avoid and minimize potential adverse impacts to existing resources, such as threatened and endangered species. The natural resource benefits anticipated from implementing the preferred alternative would include creation and restoration of saline marsh, dune, and associated barrier island habitats within the proposed project area. The increase in quality and acreage of fisheries habitat would be expected to have long-term beneficial impacts. This conclusion is based on a review of relevant literature; site-specific data; project-specific engineering reports related to biological, physical, and cultural resources; and experience gained through many similar barrier island restoration projects in Louisiana over the past decade.

9.4.4 The Environmental Impacts of the Alternatives Considered

During the design phase, six design alternatives were assessed for short and long term attainment of the project objectives. To meet project goals and objectives, all design alternatives involve creation of a beach and dune and were designed based on results of geotechnical studies, coastal process assessments, and topographic, bathymetric, and magnetometer surveys (Thomson *et al.* 2011). All design alternatives include the same marsh elevation, borrow areas, access areas, plantings, and containment dike construction. Through various engineering assessments and computer-aided modeling, it was determined that Alternatives 2, 3 and 4 did not meet one or more of the critical project objectives (Thompson *et al.* 2011). Consequently, Alternatives 2, 3 and 4 were eliminated from detailed

evaluation. The No-Action Alternative, Alternative 1, Alternative 5, and Alternative 6 were compared in the EA. Because it is practical and feasible from a technical and economic standpoint, and had minimal environmental impacts, Alternative 5 was identified as the preferred build alternative.

The Chenier Ronquille EA provides the supporting analysis to determine whether the proposed action and design alternatives are likely to result in significant impacts to the quality of the human environment. Only short-term adverse impacts are anticipated related to construction and are considered minor and reversible. This conclusion is based on a review of relevant literature, site-specific data, and project-specific engineering reports related to biological, physical, and cultural resources. The area has numerous oil and gas pipelines in the vicinity of the proposed action. To minimize the potential damage to these features, multiple surveys have identified their locations so they may be avoided in the course of the proposed action. The construction contractor would also verify the location of these features. The preferred alternative obviates the need to cross pipeline infrastructure during the construction of the primary dike. For these reasons, adverse impacts to oil and gas infrastructure are not anticipated.

9.4.5 A List of Agencies and Persons Consulted

The project was authorized for engineering and design (Phase 1) on the 19th CWPPRA annual Priority Project List. The CWPPRA project selection process includes extensive public involvement and review by federal and state agencies. The project selection process begins around February of each year, when a series of Regional Planning Teams convene across the coast to solicit project nominations from the public, State and federal agencies, as well as members of industry and academia. The meetings are publicized via public notices and all members of the public are invited to attend. The nominated projects are screened and pared down to 20 nominees. Each federal agency represented in the CWPPRA program, the State, and each coastal parish participates in voting at the public meeting.

Interagency and academic working groups then evaluate the conceptual project. The 20 nominee projects are then voted on at a public meeting by the program's federal agencies and the State to obtain a list of the 10 top-ranking projects to continue through the process. These candidate projects undergo several months of further design and interagency evaluation. In the first months of each calendar year, the candidate projects are presented at a public meeting and voted on by the program agencies to be funded for Phase 1 analysis, which includes the activities necessary to complete engineering and design, permitting, land rights, and environmental compliance before the project moves to construction. All public meetings provide an opportunity for comment by interested parties. The Draft Chenier Ronquille EA was released for public comment on December 1, 2011. No comments were received.

9.4.6 Summary and Next Steps

As discussed above, DOI intends to adopt the 2013 Environmental Assessment for the Chenier Ronquille Barrier Island Restoration Project (Chenier Ronquille EA), BA-76, prepared by NOAA (2013) to fulfill DOI's NEPA requirements for analysis of the Chenier Ronquille restoration location of the Louisiana Outer Coast Restoration project. The Trustees will consider public comment and information relevant to environmental concerns bearing on the proposed actions or their impacts. Final determination on this

project (Louisiana Outer Coast Restoration) will be included in the final Phase III ERP/PEIS and Record of Decision. This project would be implemented in accordance with all applicable laws and regulations.

9.4.7 References

Council on Environmental Quality (CEQ). 1992. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Reprint, 40 C.F.R. Parts 1500-1508, Executive Office of the President, Council on Environmental Quality, 1992.

LCWCRTF. 2009. 19th Priority Project List Report (Appendices). Louisiana Department of Natural Resources. Baton Rouge, Louisiana. 305 pp.

Louisiana Coastal Wetlands Conservation and Restoration Task Force (LCWCRTF). 1993. Louisiana Coastal Wetlands Restoration Plan: Main Report and Environmental Impact Statement. 163 pp.

NOAA. 2013. Chenier Ronquille Barrier Island Restoration Project Environmental Assessment, Fed No. BA-76, Plaquemines Parish, Louisiana.

Thompson, G, W. Thompson, A. Wycklendt, and D. Swigler. 2011. Chenier Ronquille Barrier Island Restoration Project (BA-76)- 95% Design Report. Boca Raton, FL: Coastal Planning and Engineering, Inc 135pgs

U.S. Army Corps of Engineers (USACE). 2004. Final Programmatic Environmental Impact Statement. Volume 2 of the Louisiana Coastal Area Ecosystem Restoration Study. November 2004.

9.5 Louisiana Outer Coast Restoration: Environmental Review C (Shell Island)

For the Shell Island (East and West Lobes) location of the Louisiana Outer Coast Restoration project, DOI has independently evaluated two relevant NEPA documents: (1) the Louisiana Coastal Area (LCA) Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final Environmental Impact Statement (EIS) (USACE 2012a), which considers a wide range of alternatives for restoration of Shell Island; and (2) the Shell Island Barrier Island Restoration Project Environmental Assessment (EA) (USACE 2012b), which describes the currently proposed project.

The LCA EIS includes an in-depth discussion of the environmental consequences of barrier island restoration at the Shell Island location and DOI finds that it complies with CEQ and DOI requirements for adopting NEPA analyses prepared by other agencies (See Section 7.8 for information on DOI NEPA adoption regulations and criteria). This document can be found in its entirety at (<http://losco-dwh.com>). Accordingly, DOI intends to adopt the LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS to fulfill DOI's NEPA requirements for analysis of the Shell Island (East and West Lobes) location of the Louisiana Outer Coast Restoration project. The USACE EA has relevant information but does not meet all of DOI's criteria for adoption. Below is a brief summary of the portions of the documents that are relevant to this proposed project.

9.5.1 Proposed Action

Restoration at the Shell Island (East and West Lobes) location would occur on Shell Island West and the western portion of Shell Island East, two barrier islands located along the southern margin of the Barataria Basin in Plaquemines Parish (Figure 9-11). Construction of Shell Island would utilize hydraulically dredged sediments to create beach, dune, and back-barrier marsh habitats. The back-barrier marsh platform would be constructed to an elevation of +2.5 ft. NAVD88. This elevation was also used on the Shell Island East Berm Barrier Island Restoration Project adjacent to the east. Construction of containment dikes using in-situ material would be required for the back-barrier marsh platform to retain hydraulically dredged sediments while the platform undergoes compaction and dewatering. Containment dikes are expected to degrade naturally over time. If necessary, dikes would be gapped after a period of time to allow hydrologic connection to the bay and to prevent ponding of water within the containment area. The dune platform would be constructed to an elevation of +8.0 ft. NAVD88, and sand fencing will be erected to capture windblown sand and foster dune development. The dune platform and portions of the supratidal areas would be planted with native vegetation shortly after construction. The back-barrier marsh platform would be planted after a period of compaction and dewatering has occurred and the platform is stable enough for planting activities.

This design includes the restoration of Shell Island West and the western portion of Shell Island East. Access channel and spoil areas include excavation and disposal areas. The Shell Island East Berm Barrier Island Restoration Project (BA-110), which includes the restoration of the eastern portion of Shell Island East, was constructed in 2013.

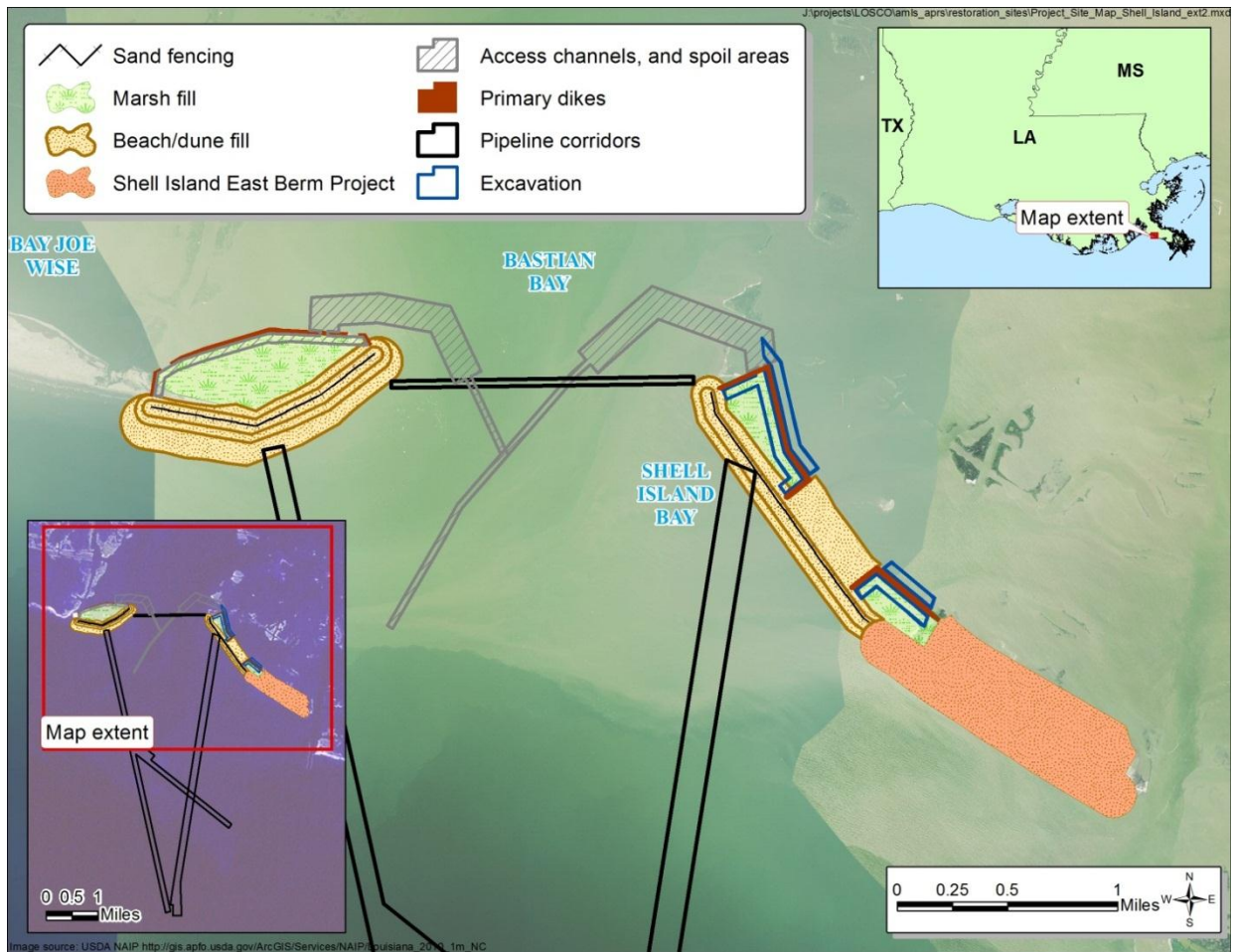


Figure 9-11. Conceptual design for Shell Island (East and West Lobes) location, [also referred to as the Shell Island West NRDA (East and West Lobes) Barrier Island Restoration (BA-111)].

9.5.2 Background

Plans and proposals to restore Shell Island have been developed in multiple documents, including Coast 2050: Toward a Sustainable Coastal Louisiana (LCWCRTF and WCRA 1998), the LCA Ecosystem Restoration Study (USACE 2004a), the Barataria Basin Barrier Shoreline Restoration Feasibility Report (Thomson et al. 2008), the LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS (USACE 2012a), and the Shell Island Barrier Island Restoration Project Environmental Assessment (EA) (USACE 2012b).

The LCA Ecosystem Restoration Study (USACE 2004a) included the Barataria Basin Barrier Shoreline Restoration as a near-term critical restoration feature under the LCA Plan. Caminada Headland and Shell Island reaches were specific features proposed as part of the near-term Barataria Basin Barrier Island Restoration plan. General information on the need for the Barataria Basin Barrier Shoreline Restoration project, the affected environment, and the environmental consequences were presented in the Final Programmatic EIS for the Louisiana Coastal Area (LCA) Ecosystem Restoration Study (USACE 2004b).

A more detailed evaluation of the alternatives and environmental consequences for the Barataria Basin Barrier Shoreline Restoration project was presented in the LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS (USACE 2012a). The potential environmental consequences for implementing the Recommended Plan / National Ecosystem Restoration (NER) Plan (Caminada Headland Alternative 5 and Shell Island Restoration Alternative 5), compared to the no action alternative, were considered (USACE 2012a). The impact analysis was based on a combination of scientific and engineering analyses, professional judgment, and previously compiled information (USACE 2012a). Under the proposed Recommended Plan/NER Plan, short-term impacts are anticipated as a result of the dredging and placement of borrow material during the construction activities, including covering of existing vegetation, increasing the level of turbidity in the water (water quality), the displacement of wildlife and fisheries, and injury to sessile or slow moving organisms. Short-term increases in the noise level and impacts to air quality (e.g., emissions), navigation, commercial fisheries, and recreational activities are also anticipated as a result of the construction activities. In addition, the Gulf of Mexico and Mississippi River water bottoms would be impacted from the removal of sand resources from the borrow site. Over the long-term, project implementation would result in the restoration of beach, dune, and back-barrier marsh habitat, and would provide important and essential habitats used by fish and wildlife for spawning, nursery, nesting, feeding, and cover. Indirect benefits to commercial and recreational fisheries are expected by increasing the quantity and quality of essential fish habitat. This Final EIS also provides information on measures that should be taken to avoid and minimize potential adverse impacts to existing resources, such as threatened and endangered species.

An EA and Statement of Findings was completed for the Shell Island Barrier Island Restoration Project by the USACE in 2012 (USACE 2012b). The Shell Island Barrier Island Restoration Project EA provides information on the excavation and deposit of fill for constructing the Shell Island East Berm Barrier Island Restoration Project (BA-110) and the Shell Island West NRDA (East and West Lobes) Restoration Project (BA-111). The proposed action described here only includes the Shell Island West NRDA (East and West Lobes) Restoration Project (BA-111); the Shell Island East Berm Barrier Island Restoration Project (BA-110) was constructed in 2013.

9.5.3 Alternatives Analysis

In the LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS (USACE 2012a), a total of 8 action alternatives for Shell Island, in addition to the No Action Alternative, were evaluated. All of the action alternatives involved the creation of barrier island back-barrier marsh, beach, and dune habitat, and were based on a feasibility study by Thomson et al. (2008). Alternative 1 would restore two islands, with no renourishment. Alternative 2 would restore two islands, with 10 years of renourishment. Alternatives 3 – 8 would restore a single island, under different renourishment scenarios. Based on an analysis of ecosystem benefits and cost-effectiveness, Shell Island Alternative 5, combined with Caminada Headland Alternative 5, was selected as the NER Plan and the Recommended Plan. Under Shell Island Alternative 5, Shell Island would be restored as a single island with 10 years of advanced fill, and re-nourished 20 years and 40 years after initial construction.

In developing specific engineering plans to implement restoration on Shell Island, CPRA developed a design that includes the construction of two separate lobes, Shell Island West and Shell Island East

(Figure 9-6). No practicable, less damaging on-site or off-site alternatives were found feasible to the proposed restoration project (USACE 2012b). The proposed action described here is for the Shell Island West NRDA (East and West Lobes) Restoration Project (BA-111), which includes construction of the West Lobe and a portion of the East Lobe (Figure 9-6). As discussed above, the Shell Island East Berm Barrier Island Restoration Project (BA-110) was constructed in 2013.

9.5.4 Findings

9.5.4.1 Summary

The LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS (USACE 2012a) provides the supporting analysis to determine whether the Shell Island Restoration is likely to result in significant impacts to the quality of the human environment. As stated in this document, the restoration of Shell Island is expected to provide long-term benefits to Louisiana coastal resources without significant long-term adverse environmental impacts. Construction-related adverse impacts, such as noise, increased water turbidity, increased air emissions, the placement of borrow material on existing habitat, and the displacement of wildlife and fisheries, are considered short-term and temporary. Over the long-term, project implementation would result in the restoration of beach, dune, and back-barrier marsh habitat, and would provide important and essential habitats used by fish and wildlife. Indirect benefits to commercial and recreational fisheries are expected by increasing the quantity and quality of essential fish habitat.

9.5.4.2 Public Input

A Notice of Intent to prepare a Final EIS for the LCA Caminada Headland and Shell Island Restoration Feasibility Study was published in the *Federal Register* (volume 70, number 96) on May 19, 2005. Scoping meetings were held on June 8, 2000; June 20, 2000; June 14, 2005; and June 16, 2005. Public meetings were held on July 26, 2011 in Plaquemines Parish and July 28, 2011 in Lafourche Parish, Louisiana. Meetings were held with stakeholders throughout the planning process.

For the Shell Island Barrier Island Restoration Project EA (USACE 2012b), a 20 day Joint Public Notice with the LA Department of Environmental Quality and the LA Department of Natural Resources was issued on May 8, 2012. All comments received during the 20 day public notice along with any observations by the USACE office and departments of the USACE district were forwarded to CPRA on June 8, 2012 for their concurrence or response. Engineering comments from the USACE district were forwarded to the applicant on June 28, 2012 for their concurrence or reply.

9.5.4.3 Potential Adverse Impacts to Infrastructure

Numerous oil and gas pipelines are present in the vicinity of the proposed action. To minimize the potential damage to these features, the pipeline locations have been identified so they may be avoided in the implementation of the proposed action. The construction contractor would also verify the location of these features prior to any construction activities. The proposed action obviates the need for any construction activities near pipeline infrastructure during the construction of the primary dike. For these reasons, adverse impacts to oil and gas infrastructure are not anticipated.

9.5.5 Additional Considerations

9.5.5.1 Cultural Resources

The LCA Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final EIS (USACE 2012a) analysis of cultural resources is adequate for purposes of adoption. In addition, a complete review of this project under Section 106 of the National Historic Preservation Act would be completed as environmental review continues. This project would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

9.5.5.2 Miscellaneous Environmental Protection Measures/Best Practices

The Trustees intend to implement a number of best practices at the Shell Island West NRDA (East and West Lobes) location to reduce the potential for adverse impacts on sensitive resources. For example, to reduce potential impacts to the Pallid sturgeon, the cutterhead will remain completely buried in the sediment during dredging operations. The Contractor will be responsible for surveillance, management, and control of their construction activities to minimize interference with, disturbance to, and damage of water, fish, and wildlife resources. The Contractor shall be aware of threatened and endangered species and migratory birds, and implement practices and follow all conditions set forth by NOAA, USFWS, and LDWF to protect these resources. No critical habitat is designated within the action area. No bald eagles are present within the action area. In addition, the Guidelines for Activities in Proximity to Manatee and Their Habitat will be followed during all phases of in-water work.

Consultation under the ESA will be reinitiated with the U.S. Fish and Wildlife Service, if necessary, to evaluate any potential impacts to the newly proposed species, red knot. The Trustees intend to implement best practices as described in the Final EIS, and would consider any additional practices that may emerge from additional regulatory consultations and summarize those in the final Phase III ERP/PEIS.

In addition, the Trustees intend to implement NOAA's Measures for Reducing Entrapment Risk to Protected Species, revised on May 22, 2012 (NOAA 2012). These measures are included below:

Pre-construction planning

During project design, the project proponents will incorporate at least one escape route into the proposed retention structure(s) to allow any protected species to exit the area(s) to be enclosed. Escape routes must lead directly to open water outside the construction site and must have a minimum width of 100 feet. Escape routes should also have a depth as deep as the deepest natural entrance into the enclosure site and must remain open until a thorough survey of the area, conducted immediately prior to complete enclosure, determines no protected species are present within the confines of the structure.

Pre-construction compliance meeting

Prior to construction, project proponents, the contracting officer representative, and construction personnel should conduct a site visit and meeting to develop a project-specific approach to implementing these preventative measures.

Responsible parties

The project proponents will instruct all personnel associated with the project of the potential presence of protected species in the area and the need to prevent entrapment of these animals. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing protected species. Construction personnel will be held responsible for any protected species harassed or killed as a result of construction activities. All costs associated with monitoring and final clearance surveys will be the responsibility of project proponents and will be incorporated in the construction plan.

Monitoring during retention structure construction

It is the responsibility of construction personnel to monitor the area for protected species during dike or levee construction. If protected species are regularly sighted over a 2 or 3 day period within the enclosure area during retention structure assembly, construction personnel must notify the project proponent. It is the responsibility of the project proponent to then coordinate with the NMFS Marine Mammal Health and Stranding Response team (1-877-WHALE HELP [1-877-942-5343]) or the appropriate State Coordinator for the Sea Turtle Stranding and Salvage Network (see http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm) to determine what further actions may be required. Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area.

Pre-closure final clearance

Prior to completing any retention structure by closing the escape route, the project proponent will ensure that the area to be enclosed is observed for protected species. Surveys must be conducted by experienced marine observers during daylight hours beginning the day prior to closure and continuing during closure. This is best accomplished by small vessel or aerial surveys with 2-3 experienced marine observers per vehicle (vessel/helicopter) scanning for protected species. Large areas (e.g. >300 acres) will likely require the use of more than one vessel or aerial survey to ensure full coverage of the area. These surveys will occur in a Beaufort sea state (BSS) of 3 feet or less (measured within the area being closed by the containment), as protected species are difficult to sight in choppy water. Escape routes may not be closed until the final clearance determines the absence of protected species within the enclosure sight.

Post closure sightings

If protected species become entrapped in an enclosed area, the project proponent and NMFS must be immediately notified. If observers note entrapped animals are visually disturbed, stressed, or their health is compromised then the project proponent may require any pumping activity to cease and the breaching of retention structures so that the animals can either leave on their own or be moved under the direction of NMFS.

In coordination with the local stranding networks and other experts, NMFS will conduct an initial assessment to determine the number of animals, their size, age (in the case of dolphins), body condition, behavior, habitat, environmental parameters, prey availability and overall risk.

If the animal(s) is/are not in imminent danger they will need to be monitored by the Stranding Network for any significant changes in the above variables.

Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area. Coordination by the project proponent with the NMFS SER Stranding Coordinator may result in authorization for these actions.

NMFS may intervene (catch and release and/or rehabilitate) if the protected species are in a situation that is life threatening and evidence suggests the animal is unlikely to survive in its immediate surroundings.

Surveys will be conducted throughout the area at least twice or more in calm surface conditions (BSS 3 feet or less - (measured within the area being closed by the containment)), with experienced marine observers, to determine whether protected species are no longer present in the area.

9.5.6 Summary and Next Steps

As discussed above, DOI intends to adopt the Louisiana Coastal Area (LCA) Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final Environmental Impact Statement (EIS) (USACE 2012a) to fulfill DOI's NEPA requirements for analysis of the Shell Island (East and West Lobes) location of the Louisiana Outer Coast Restoration project. The Trustees will consider public comment and information relevant to environmental concerns bearing on the proposed actions or their impacts. Final determination on this project (Louisiana Outer Coast Restoration) will be included in the final Phase III ERP/PEIS and Record of Decision. This project would be implemented in accordance with all applicable laws and regulations.

9.5.7 References

- Louisiana Coastal Wetlands Conservation and Restoration Task Force (LCWCRTF) and Wetlands Conservation and Restoration Authority (WCRA). 1998. Coast 2050: Toward a Sustainable Coastal Louisiana. Louisiana Department of Natural Resources. Baton Rouge, LA.
- Thomson, G.G., T.J. Campbell, V. Grabowski, and B. Kendrick. 2008. Barataria Basin Barrier Shoreline Restoration Feasibility Report. Appendix C, Shell Island, Plaquemines Parish, Louisiana. Prepared for Louisiana Department of Natural Resources. Coastal Planning & Engineering, Boca Raton, FL. Available: <http://www.lca.gov/Library/FileDownload.aspx?ProdType=4&id=3142> (Appendix A Annex 2 of the Louisiana Coastal Area Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final Environmental Impact Statement, pp. 428-598). Accessed August 20, 2013.
- USACE. 2004a. Louisiana Coastal Area (LCA) Louisiana Ecosystem Restoration Study. Final Volume 1: LCA Study - Main Report. U.S. Army Corps of Engineers, New Orleans District, New Orleans, LA. November. Available: www.lca.gov/Library/FileDownload.aspx?ProdType=0&id=1137. Accessed August 14, 2013.
- USACE. 2004b. Louisiana Coastal Area (LCA) Louisiana Ecosystem Restoration Study. Final Volume 2: Programmatic Environmental Impact Statement. U.S. Army Corps of Engineers, New Orleans

District, New Orleans, LA. November. Available:

<http://www.lca.gov/Library/FileDownload.aspx?ProdType=0&id=1147>. Accessed August 14, 2013.

USACE. 2012a. Louisiana Coastal Area Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final Environmental Impact Statement. U.S. Army Corps of Engineers, Mississippi Valley Division, New Orleans District. March. Available:
<http://www.lca.gov/Library/FileDownload.aspx?ProdType=4&id=3138>. Accessed April 23, 2013.

USACE. 2012b. Memorandum for Record Subject: Department of the Army Environmental Assessment and Statement of Finding for Above-Numbered Permit Application. APPLICATION: MVN-2012-0922-EFF (Shell Island Barrier Island Restoration Project). July 19.

9.6 Louisiana Outer Coast Restoration Project: Environmental Review D (North Breton Island)

The proposed project—located at the southern end of the Chandeleur Island chain in Louisiana—would rebuild and re-establish portions of North Breton Island by restoring sand and sediment into the North Breton Island system. This project is intended to restore the island’s physical and ecological functions by creating beach, dune and marsh habitats to support nesting brown pelicans, terns, skimmers and gulls—four bird groups injured by the Spill.

9.6.1 Introduction and Background

Breton National Wildlife Refuge (NWR) is recognized by the National Audubon Society as a globally important bird area due to the resources it provides birds. North Breton Island (part of Breton NWR) hosts one of Louisiana’s largest historic brown pelican nesting colonies. However, surveys by Breton NWR staff indicate that this colony has declined from over 15,000 pairs prior to 1998 to less than several thousand, including a reduction of approximately 50% of breeding pelicans between 2008 and 2012. Without actions to restore sand into the North Breton Island system, the island is expected to completely submerge sometime between 2013 and 2037 and evolve into a re-emerging sand bar (Lavoie 2009), rendering the island unusable by nesting brown pelicans and other seabirds. North Breton Island Restoration is designed to increase the longevity of beach, dune and back barrier marsh habitats, providing nesting habitat for brown pelicans, terns, skimmers and gulls.

Restoration of North Breton Island would be designed to mimic the natural processes of barrier island evolution, including the lateral transport of sand. The conceptual design for placement of sand and back barrier marsh sediment mimics the pre-Hurricane Katrina island coverage and expected island evolution pattern. Approximately 3.7 million cubic yards of sand, silt and clay material would be dredged from borrow site(s) located within an offshore shoals borrow area southeast of Breton Island. This sand, silt, and clay material would then be placed on the existing submerged island to create the desired island configuration. Planting of the dune and back-barrier marsh area with native vegetation is planned to take place following construction. Sand fencing would be utilized to trap and retain deposited sediments and help build dune habitats. The proposed project design utilizes proven techniques and established methods used in other Louisiana barrier island restoration projects, such as those constructed through the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) program.

Consistency with Delta and Breton National Wildlife Refuges Comprehensive Conservation Plan

Breton Island NWR was established in 1904 and is the second oldest national wildlife refuge in the National Wildlife Refuge System. The objectives of the refuge are to (1) provide sanctuary for nesting and wintering seabirds, (2) protect and preserve the wilderness character of the islands, and (3) provide sandy beach habitat for a variety of wildlife species. These actions are consistent with the mandates of the National Wildlife Refuge System. In 2008, the refuge developed a comprehensive conservation plan to describe refuge management—the Delta and Breton National Wildlife Refuges Comprehensive Conservation Plan (CCP)(USFWS 2008).

The proposed North Breton project is consistent with the goals, objectives, and strategies of the Delta and Breton National Wildlife Refuges CCP (USFWS 2008). In addition, it explicitly meets the objectives of

the refuge and supports the mission of the Refuge System, as defined by the National Wildlife Refuge System Improvement Act of 1997:

“...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” 16 U.S.C. §668 dd(a)(2).

9.6.2 Project Location

The project would have impacts at two locations: the restoration site at North Breton Island and the borrow area and dredge pipeline corridor located to the southeast of the island.

North Breton Island Restoration Site

The proposed restoration is located in the Breton NWR on North Breton Island at the southern end of the Chandeleur Island chain in the State of Louisiana, Plaquemines Parish in Breton Sound, part of the Gulf of Mexico (Figure 9-12). The approximate coordinates for the island are Latitude 29°29'22.91"N and Longitude 89°10'16.91"W. The proposed project location is managed by USFWS (Southeast Region).

Borrow Source

The borrow area to be used for the proposed restoration project is located approximately 2.5 miles southeast of Breton Island (Figure 9-13). Specific borrow sites would be identified within this area based on geotechnical analyses and testing of potential dredge material. The approximate center coordinates for the borrow site are Latitude 29°44'83.98"N and Longitude 89°07'84.26"W. A corridor would be established between the borrow site(s) and the restoration site to facilitate the placement of a temporary pipeline for transport of hydraulically dredged fill material.

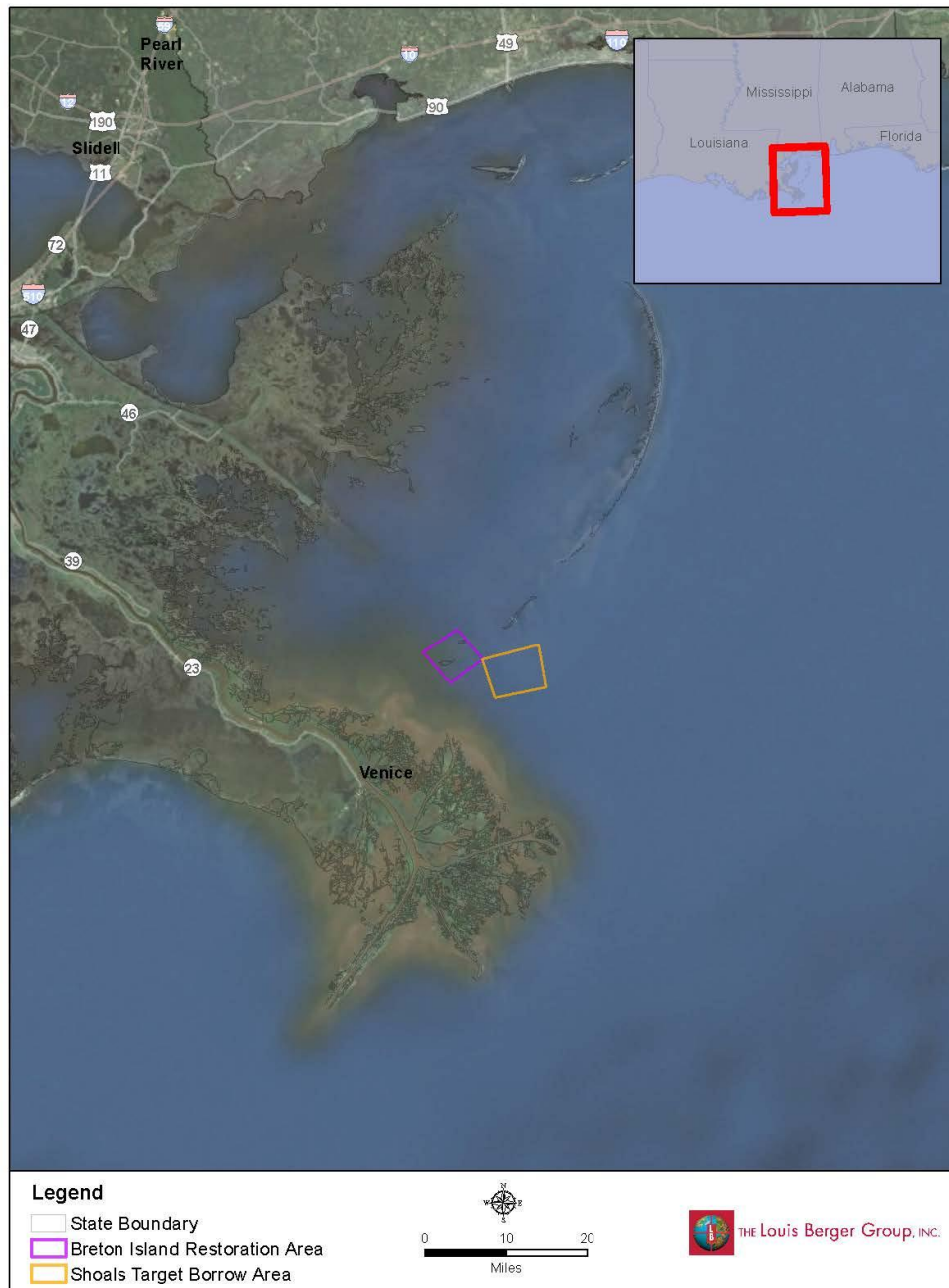


Figure 9-12. Project location.

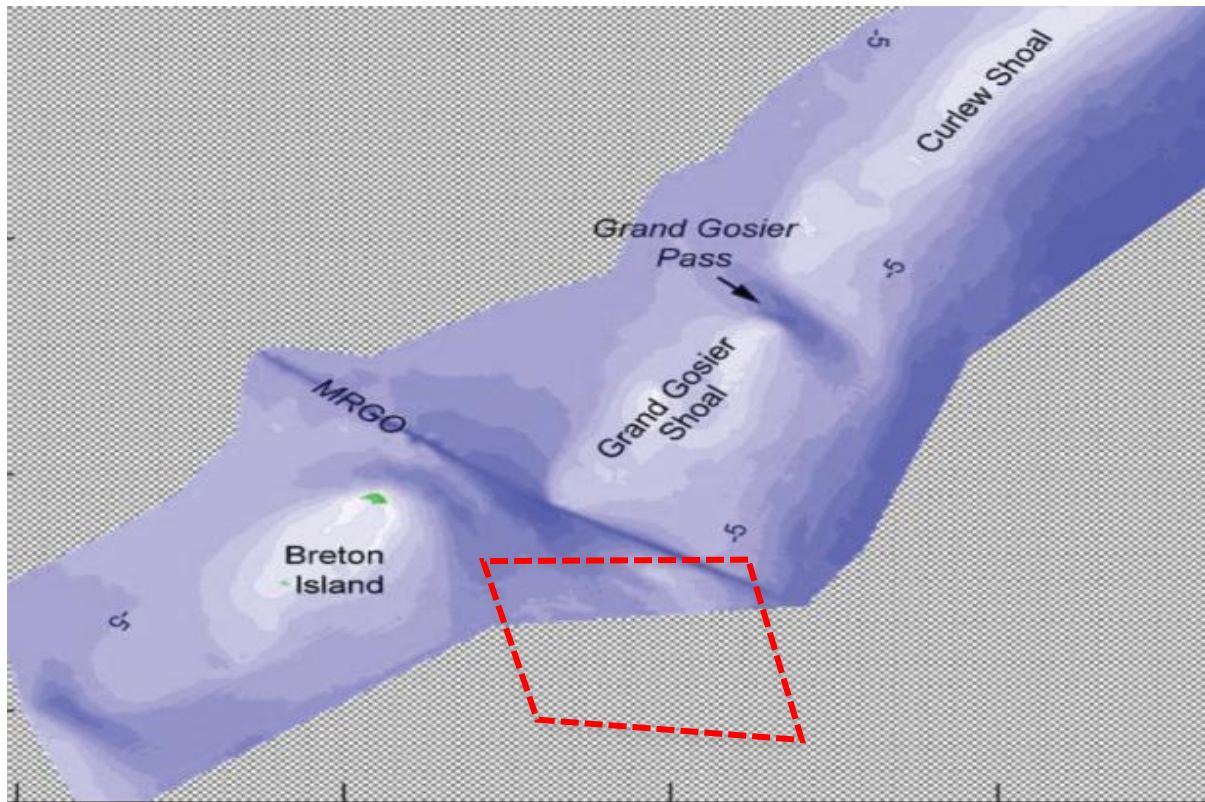


Figure 9-13. Proposed Offshore Shoals Borrow Areas.

9.6.3 Construction and Installation

Island and Back-barrier Marsh

The project is expected to restore approximately 3.0 miles (16,000 linear feet) of beach (76.2 acres), dune (138.7 acres), and back-barrier marsh (137.3 acres) habitat on North Breton Island for a total of 352 acres of barrier island habitat. The dune would be approximately 9 feet-high by 100 feet-wide at the top and 400 feet-wide at the base. The beach would be 3 feet-high by 200 feet-wide, and the back barrier marsh would be 500 feet-wide by 3 feet-high (above existing water depths) for a total expected project width of 1,100 feet. Earthen containment dikes would be necessary to retain placed sediments. The typical containment dike profile would include a +5 ft. NAVD elevation, a crest width of 10 ft., and side slopes 1 vertical: 4 horizontal. The containment dikes would be expected to degrade through natural erosion from waves. Dikes would be gapped after settlement of marsh fill materials, if necessary, to allow hydrologic connection should the expected erosion or settlement not occur. Sand fencing (fencing to capture sand that is naturally transported by wind) would be erected on the constructed dune to capture naturally windblown sand to passively build or maintain the dune feature. Sand fencing would be inspected annually and replaced as necessary over the project life.

After a period of settlement and salinity stabilization of placed materials, native intertidal and dune habitat species would be planted in dune and marsh areas. Plantings would help establish the plant

community, and foster retention of placed sediments. Marsh plantings would include smooth cordgrass (*Spartina alterniflora*) and possibly black mangrove (*Avicennia germinans*). Dune species would likely include bitter panicum (*Panicum amarum*). Other possible dune species include sea oats (*Uniola paniculata*), roseau cane (*Phragmites australis*), marshhay cordgrass (*Spartina patens*), gulf cordgrass (*Spartina alterniflora*), matrimony vine (*Lycium barbarum*), or wax myrtle (*Morella cerifera*).

Borrow Area

The borrow area would be located in an offshore shoal area southeast of North Breton Island. Selection of specific borrow site(s) within in the borrow area would be based on geotechnical and sediment (American Society for Testing and Materials (ASTM) standard particle size analysis of soils) analyses of potential dredge material. Dredged material would be transported to the island via a hydraulic dredge pipeline. A small portion (3,000 feet) of the dredge pipeline—called a pontoon line—may be floating behind the dredge, but the majority would be on the sea floor.

Approximately 3.7 million cubic yards of sand, silt and clay material would be dredged from the borrow area with a hydraulic dredge with a cutterhead. The cutterhead mechanism loosens the bed material and transports it to the suction mouth. The material would be transported via pipeline from the borrow sites to the Breton Island restoration site. Containment dikes would be constructed on the island and in shallow water to contain the dredged material for marsh restoration then degraded after construction. Bulldozers would shape the sand for the dune and beach portions of the project.

Construction Equipment and Logistics

A barge mounted hydraulic dredge with a cutterhead, and a barge mounted booster pump (self-contained barge possibly 90 feet long X 30 feet wide with a crew), and up to 10 miles of dredge pipeline would be used to dredge material and transport it from the borrow site to the island for use in the restoration project. Marsh buggy track hoes (approximately 2 to 5) would be used to construct containment dikes and move dredge pipe. A barge mounted dragline may also be used for construction of the containment dikes. Two or more bulldozers would shape the sand for the dune and beach. Equipment and personnel would be transported to the site via barges, tugboats, and crew boats. In addition, there may be a living quarters barge on site for the crew. Sampling vessels would be used for surveying, sediment borings, and geotechnical work needed for engineering and design.

Construction of the project is expected to take between 6 and 12 months to complete. Construction time would be 10 to 12 hours a day (depending on season and light availability). The project would require approximately 30-40 workers during the 6 to 12 month construction period. Sanitary waste disposal would be provided for the workers during construction. Louisiana Hwy 23 would likely be used to transport workers and some lighter equipment. It is unknown at this time exactly where barges would deploy from, but they would likely come from the Mississippi River to the project site by way of Breton Sound. Personnel shift changes would likely be transported from Venice, LA via crew boats. The bulk of the equipment would be transported via barges through the Mississippi River, Gulf Intracoastal Waterway and other channels.

9.6.4 Operations and Maintenance

North Breton Island is considered a barrier island. Barrier islands are dynamic systems in constant flux formed by the interaction of wave, wind, and tidal energies that erode, transport, and deposit sediments (Leatherman 1982). Because of these processes, islands like North Breton Island are constantly in transition and moving landward (Lavoie 2009).

The performance of the North Breton Island restoration would be assessed using both qualitative and quantitative monitoring protocols. The monitoring program would use performance standards related to the objectives of the project (increased nesting pelicans, terns/skimbers and gulls) that would facilitate evaluation of project performance over time and the potential need for corrective actions. Monitoring would be conducted during and following construction to ensure that project designs and necessary corrective actions are correctly implemented. Post construction performance monitoring would also be conducted to evaluate the project's performance over time with respect to project objectives and to inform adaptive management potentials.

Post-construction monitoring would track the performance of restored beach, dune, and back-barrier marsh habitats, as well as the presence of various species of nesting birds (e.g., brown pelicans, terns, skimmers, and gulls) within restored habitat areas. Proposed performance monitoring at each component could include:

- Annual nest count surveys to estimate additional breeding pairs of brown pelicans, terns/skimbers, and gulls supported by restoration activities;
- Spatial analysis of color-infrared aerial photography collections to monitor changes in habitat; and
- Light Detection and Ranging (LIDAR) and bathymetric surveys to monitor changes in post-construction habitat elevations and island platform bathymetry.

Additional details concerning performance monitoring will be developed prior to project implementation.

9.6.5 Affected Environment and Environmental Consequences

Under the National Environmental Policy Act, federal agencies must consider environmental effects of their actions that include, among others, impacts on social, cultural, and economic resources, as well as natural resources. The following sections describe the affected resources and environmental consequences of the project.

9.6.5.1 No Action

Both OPA and NEPA require consideration of the No Action alternative. For this Draft Phase III ERP proposed project location, the No Action alternative assumes that the Trustees would not pursue the North Breton Island location of the Louisiana Outer Coast Restoration project as part of Phase III Early Restoration.

Under the No Action alternative, the existing conditions described for the project location in the affected resources subsections would prevail. Restoration benefits associated with this project location would not be achieved at this time.

9.6.5.2 Physical Environment

Geology and Substrates

Affected Resources

The project area is located in Breton Sound which is part of the Gulf of Mexico. The seafloor within the general project area is somewhat uneven and slopes toward the south. The geology of the region is a complex assemblage of Pleistocene and Holocene and deltaic, nearshore marine, and coastal sedimentary deposits (Pearson 2001). The Holocene deposits overlay older Pleistocene fluvial and deltaic sediments. The surficial seafloor deposits in the project area are identified as "reworked Mississippi Delta" sediments. These sediments typically consist of greater than 80 percent sand and lack clay altogether.

The land that forms Breton NWR is located in a delta lobe created 3,000-4,000 years ago in the St. Bernard deltaic plain of the Mississippi River. Approximately 2,000 years ago, the Mississippi River abandoned the St. Bernard delta complex and moved to the west, forming the LaFourche delta complex. As the cycle of land loss changes progressed in the abandoned delta, the Chandeleur Islands started to form. This land loss continues today and threatens the existence of the Chandeleur Islands and other lands located in the relic deltaic plain not presently receiving sediment input. The natural processes of land formation, subsidence, and sea level rise have been accelerated and altered by human activities, such as building levees, digging canals, and use of fossil fuels.

The Chandeleur Islands are dynamic and are constantly altered and worn down by hurricanes, tropical storms, wind, and tidal action. Early literature on Breton and the Chandeleur Islands mentions trees and a generally higher elevation than exists today. Present elevations of the existing islands are not much higher than sea level.

The soils in the study area have been identified and mapped by the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS 2013). The NRCS data identifies Felicity loamy fine sand, frequently flooded soil as the only soil unit mapped within the project area. The Felicity loamy fine sand is a very gently sloping, somewhat poorly drained, saline, sandy soil with elevations ranging from about 1 foot to 3 feet above sea level. The soil is subject to flooding by saltwater during high storm tides.

Environmental Consequences

The restoration would create marsh, dunes, and beach and increase elevations on the island platform (base). In addition, it would increase the width of the island creating greater resistance to tidal energies. The dredged material proposed for island and marsh construction consists of naturally occurring material deposited in the Gulf over time by geologic processes. Vegetative plantings and sand fences would stabilize soil, reduce re-suspension of recently deposited sediment, reduce wind transport of dune material off the island, and encourage sediment deposition. Over the long-term, dredged materials

removed from the borrow sites are expected to be rearranged by natural processes, creating pre-project bathymetric contours in the borrow areas.

Sediment analyses for the restoration site and potential borrow sites would be completed and analyzed prior to project implementation. Overall, the project's impacts related to soil compaction, erosion, and loss during construction at both the island and borrow site(s) would be minor and in the long term, the project would not be expected to adversely impact geology or substrates.

Hydrology and Water Quality

Affected Resources

Currents in the Gulf are characterized by an "offshore," or open Gulf, and an "inshore," or shelf energy, regime. The open Gulf is influenced by the Loop Current. The shelf circulation shows strong influence from secondary flows of the Loop Current. Currents along the southeastern Louisiana coast flow in a predominantly eastward direction. Longshore currents in the project area are generally light to moderate. Winds in the project area are dominated by easterly trades that flow from the southwest in the summer and from the northeast in winter.

The Breton Sound estuary is about 20 miles wide at the gulf coastline and extends 50 miles inland to Caernarvon, Louisiana. Breton Sound receives inflow and runoff from the Mississippi River. The Caernarvon Freshwater Diversion project diverts fresh water and its accompanying nutrients and sediments from the Mississippi River to coastal bays and marshes in Breton Sound.

Breton Island and the Chandeleur Islands are surrounded by shallow sea water and contain interior ponds that can be somewhat fresher from rainfall. The marshes and ponds of Breton Sound range from fresh where influenced by the Mississippi River to brackish closer to the shoreline with the Gulf of Mexico and Breton Sound. The system is open and not managed by any control structures on the refuge.

According to the Louisiana Department of Environmental Quality (Louisiana DEQ 2012), the waters of Breton Sound do not fully support the designated uses of primary contact recreation (e.g., swimming), fish and wildlife propagation, and oyster propagation. Breton Sound is listed on the US EPA's 303(d) list of impaired waters, with fecal coliform cited as the cause of impairment.

Environmental Consequences

The proposed project would create a localized and temporary increase in turbidity as sediments are dredged from the borrow sites and discharged and placed in the project area. If the disturbed sediments are anoxic, the biological oxygen demand in the water column would increase. No known toxic or hazardous conditions exist in the borrow sites. Dredging could exhume buried debris. It is not expected that such debris would cause water quality concerns. Incidental discharges of fuel and oil from construction equipment could occur. However, a Spill Prevention, Control, and Countermeasure Plan would be developed and implemented to reduce this risk. Any changes in hydrology would be reflective of past island conditions as the island is rebuilt.

Overall, potential impacts to water resources are expected to be short term and minor as a result of increases in turbidity during active dredging activities.

9.6.5.3 Air Quality and Greenhouse Gas Emissions

Affected Resources

The Clean Air Act ("CAA") requires the State of Louisiana to adopt ambient air quality standards to protect the public from potentially harmful amounts of pollutants. Six common air pollutants (also known as "criteria pollutants") are regulated by EPA. They are particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The Louisiana Department of Environmental Quality has designated areas meeting the state's ambient air quality standards by their monitoring and modeling program efforts, (i.e., attainment areas). Louisiana has no carbon monoxide, nitrogen oxides, sulfur oxides, particulate or lead nonattainment areas.

Currently, Plaquemines Parish is classified by EPA as an attainment area in accordance with the National Ambient Air Quality Standards (NAAQS). The EPA's GHG Reporting Rule establishes mandatory GHG reporting requirements for sources that emit 25,000 metric tons or more of carbon dioxide equivalent (CO₂e) per year (EPA 2013a). Many sources of man-made air pollution affect Breton NWR including onshore industry, power plants, car emissions, and offshore oil and gas development (DRI 2013; USFWS 2013c).

Environmental Consequences

Project implementation would require the use of boats as well as barge-mounted and land-based heavy equipment for up to 10 or more hours per day over a 6-12 month construction period. This would temporarily affect air quality and elevate greenhouse gas emissions in the project vicinity due to emissions and increased dust from operation of construction vehicles and equipment. Any air quality impacts that would occur would be localized, limited to the construction phase of the project, and limited by the size of the project. Therefore, short-term, minor impacts to air quality would occur. The project would have no long term impacts on air quality.

Engine exhaust from hydraulic cutterhead dredge, booster pumps, front-end loaders, cranes, boats, and trucks would contribute to an increase in greenhouse gas emissions. The following tables describe the likely greenhouse gas emission scenario for the implementation of this project.

Based on the assumptions described in Table 9-1 below, GHG emissions would not exceed 25,000 metric tons per year. Given the projected construction-phase GHG emissions, along with the small scale and short duration of the project, predicted impacts from greenhouse gas emissions would be short-term and minor.

Table 9-1. Greenhouse Gas Impacts of the Proposed Project.

VESSEL/CONSTRUCTION EQUIPMENT	NO. OF HOURS OPERATED ¹	CO ₂ (METRIC TONS) ²	CH ₄ (CO ₂ E) (METRIC TONS) ³	N ₂ O (CO ₂ E) (METRIC TONS)	TOTAL CO ₂ E (METRIC TONS)
Crane	2,400	87	0.03	0.3	87.33
Grader	2,400	117	0.09	9	126.09
Bulldozer (2)	4,800	228	0.12	1.2	229.32
Trackhoe (2)	4,800	210	0.12	1.2	211.32
Dumptruck ⁴	2,400	102	0.06	0.6	102.66
Tugboat ⁵	2,400	4,800	9	36	4,845
Boat ⁶	2,400	1,350	3	12	1,365
Dredge Pump ⁷	2,400	911	1.1	0.5	912.6
TOTAL					7,879.32

¹ Emissions assumptions for all equipment based on 240 10-hour days of operation per piece of equipment over a 12-month construction period.

² CO₂ emissions assumptions for diesel and gasoline engines based on EPA 2009.

³ CH₄ and N₂O emissions assumptions and CO₂e calculations based on EPA 2011.

⁴ Construction equipment emission factors based on USEPA NONROAD emission factors for 250hp pieces of equipment. Data was accessed through the California Environmental Quality Act Roadway Construction Emissions Model.

⁵ Fuel economy assumptions for a 3000hp marine diesel tug based on Walsh 2008.

⁶ Fuel economy assumptions for a 300hp marine diesel powerboat and 1000hp marine diesel passenger ferry based on Becker, no date.

⁷ Fuel economy assumptions for a dredge pump based on Johnson 2013.

9.6.5.4 Noise

Affected Resources

Noise can be defined as unwanted sound and noise levels, and its impacts are interpreted in relationship to effects on nearby visitors to the NWR and wildlife. The Noise Control Act of 1972 (42 U.S.C. § 4901 to 4918) was enacted to establish noise control standards and to regulate noise emissions from commercial products such as transportation and construction equipment. The standard measurement unit of noise is the decibel (dB), which represents the acoustical energy present. Noise levels are measured in A-weighted decibels (dBA), a logarithmic scale which approaches the sensitivity of the human ear across the frequency spectrum. A 3-dB increase is equivalent to doubling the sound pressure level, but is barely perceptible to the human ear. Table 9-2 shows typical noise levels for common sources expressed in dBA. Noise exposure depends on how much time an individual spends in different locations.

Noise levels in the project area vary depending on the season, time of day, number and types of noise sources, and distance from noise sources. Existing sources of noise in the project area are from offshore oil production, commercial vessels, recreational boating, overhead aircraft and ambient natural sounds such as wind, waves, and wildlife.

Table 9-2. Common noise levels.

NOISE SOURCE OR EFFECT	SOUND LEVEL (DBA)
Rock-and-roll band	110
Truck at 50 feet	80
Gas lawnmower at 100 feet	70
Normal conversation indoors	60
Moderate rainfall on foliage	50
Refrigerator	40
Bedroom at night	25

Source: Adapted from BPA 1986, 1996

Noise-sensitive receptors include sensitive land uses and those individuals and/or wildlife that could be affected by changes in noise sources or levels due to the project. Noise-sensitive receptors in the project area include beach recreational use and wildlife.

Environmental Consequences

Instances of increased noise are expected during the construction phases associated with the restoration project. The proposed project would generate construction noise associated with equipment during placement of the fill material, grading, and dredging. Construction equipment noise is known to disturb fish, marine mammals and nesting shorebirds (discussed below). Construction noise would also create a potential nuisance to visitors to the Breton NWR in areas adjacent to project construction activities. Construction noise would be temporary and the construction period is not anticipated to last more than 12 months. Because construction noise would be temporary, negative impacts to the human environment during construction activities would be short-term and minor, as they would likely attract attention but would not result in visitors changing their activities.

After completion of the project, noise sources would be expected to include the existing sources described above, and noise levels would return to pre-project levels. Overall, long-term noise effects from boating and other recreational activities would remain minor. Likewise, noise effects from commercial vessels, offshore oil production and ambient natural sounds would be minor.

9.6.5.5 Living Coastal and Marine Resources

Vegetation

Affected Resources

Vegetation on the island consists of black mangrove (*Avicennia germinans*), smooth cordgrass (*Spartina alterniflora*) associated with the emergent salt marsh. The other vegetation habitats found on the island are dune zones of saltmeadow cordgrass (*Spartina patens*) or sea oats (*Uniola paniculata*), barrier island shrub/scrub zone of Southern wax myrtle (*Myrica cerifera*), Eastern baccharis (*Baccharis halimifolia*), and yellow rattlebox (*Sesbania drummondii*), and high marsh or upland-grassland dominated by saltmeadow cordgrass (Penland *et al.* 1997).

Wetlands are essential breeding, rearing, and feeding grounds for many species of fish and wildlife. Barrier island wetlands, flats, and subtidal habitat provide unique nursery, foraging, and spawning habitat for numerous marine and estuarine species of commercial and recreational importance. Review of the USFWS National Wetlands Inventory (NWI 2013) identified wetlands within the project area as estuarine intertidal emergent and unconsolidated shore under Cowardin classification system (Cowardin 1979).

Environmental Consequences

The project would result in conditions substantially more conducive to healthy barrier island vegetative communities than currently exists. The project proposal includes approximately 137 acres of back-barrier marsh wetland restoration, which would have an overall major beneficial effect on the wetland system on the island. Installation of native vegetative plantings will encourage colonization of native dune vegetation and the development of emergent vegetated wetlands. Dune plantings would occur post construction to stabilize newly placed sediments, and installation of native wetland vegetation on the marsh platform would occur as the material consolidates and dewateres. Project construction would result in a net benefit of an estimated 352 acres of dune (139 acres), beach (76 acres) and wetland (137 acres) habitat. The implementation of the proposed restoration activities would not be expected to disturb or adversely impact waters of the U.S. or adversely modify wetlands. While construction-related activities may temporarily disturb wetland habitat, in the longterm the proposed project would improve wetland habitat and protect it from further erosion and loss. Overall, the proposed project would provide long-term beneficial impacts on wetlands and upland habitats.

Wildlife

Affected Resources

Breton NWR provides nesting resources for twenty-three species of birds. Birds that use the project area include waterbirds, sea birds, waders, shore birds, birds of prey, and passerines. Species of concern and/or significance for management purposes that are known to occur on Breton NWR and may use the project area include: piping plover (*Charadrius melodus*), brown pelican (*Pelecanus occidentalis*), redhead (*Aythya americana*), laughing gull (*Leucophaeus atricilla*), royal tern (*Thalasseus maximus*), Caspian tern (*Hydroprogne caspia*), sandwich tern (*Thalasseus sandvicensis*), black skimmer (*Rynchops niger*), sooty tern (*Onychoprion fuscatus*), common tern (*Sterna hirundo*), least tern (*Sternula antillarum*), Forster's tern (*Sterna forsteri*), gullbilled tern (*Gelochelidon nilotica*), magnificent frigate bird (*Fregata magnificens*), great egret (*Ardea alba*), reddish egret (*Egretta rufescens*), snowy egret (*Egretta thula*), clapper rail (*Rallus longirostris*), white ibis (*Eudocimus albus*), tricolored heron (*Egretta tricolor*), black-crowned night heron (*Nycticorax nycticorax*), little blue heron (*Egretta caerulea*), herring gull (*Larus argentatus*), and kelp gull (*Larus dominicanus*) (U.S. Department of the Interior 2008). The more common nesting species include royal, Caspian, and sandwich terns, laughing gulls, brown pelicans, and black skimmers.

In the past, Breton NWR has supported large colonies of colonial nesting seabirds and still provides some nesting habitat, although limited in comparison to previous years. Historically, large nesting colonies of brown pelicans; laughing gulls; and royal, Caspian and sandwich terns used the islands. Less

abundant were nesting black skimmers, with occasional common, least, Forster's, and gull-billed terns. To avoid visitor disturbance to nesting seabird colonies, each colony is posted as a closed area during the nesting season; approximately five percent of the island is used by nesting birds.

Prior to Hurricane Katrina, terns nests numbered 35,000 to 50,000; brown pelican nests averaged 6,000 to 8,000 and peaked at approximately 12,000 nests; and black skimmers nests averaged 3,000. In the nesting seasons following Katrina, these numbers fell by approximately 80%, potentially due to loss of supporting habitat. In 2007, terns numbered 7,000 nests; brown pelicans produced 2,500 nests; and black skimmers numbered 450-500 nests.

During the winter, large numbers of waterfowl such as redheads, canvasback (*Aythya valisineria*), and scaup (*Aythya sp.*) frequent the numerous islands. Wintering waterfowl populations begin building in the fall and peak in mid-December and January. The most common species observed are mottled duck, (*Anas fulvigula*), gadwall (*Anas strepera*), northern pintail (*Anas acuta*), American wigeon (*Anas americana*), green-winged teal (*Anas crecca*), and snow geese (*Chen caerulescens*). The most common resident marsh and waterbirds are great blue heron, little blue heron, white ibis, glossy /white-faced ibis, great egrets, snowy egrets, tricolored herons, yellow-crowned night-herons (*Nyctanassa violacea*), and black-crowned night-herons. The refuge serves as a staging area for many passerine birds during migration, and large concentrations of shorebirds are sometimes observed feeding in the mudflats. Frigatebirds are regularly observed flying over the refuge. Endangered piping plover inhabit Breton NWR islands during winter periods. Bald eagles (*Haliaeetus leucocephalus*) are known to nest in southern Louisiana (Wright and Hess 2002); however, they are not known to nest within Breton NWR.

No terrestrial wildlife surveys have been conducted in the project area; however, based on the types of habitat present, and because of its size, elevation, location and overwashes, it is expected that there are no resident mammals, amphibians, or non-marine reptiles on North Breton Island. Historically there were raccoons and occasional nutria present (personal communication from Brian Spears, USFWS September 2013).

Environmental Consequences

Restoration activities at North Breton Island would be relatively short term (up to 12 months). Birds would be expected to avoid the area as desired while construction is occurring. Impacts to birds would be avoided via management guidelines and techniques developed on a species-specific basis (such as timing restriction and buffers during nesting and when species is present). No bald eagles are known to nest in Breton NWR. Thus, no adverse impacts to bald eagles are anticipated. The Trustees intend to implement best practices that are requested by USFW, NOAA and the LDWF, and would consider any additional practices that may emerge from additional regulatory consultations and summarize those in the Final ERP/PEIS.

The proposed project would create an estimated 352 acres of barrier island habitat through the restoration of about 215 acres of dune, berm and swale habitats and the protection and creation of approximately 137 acres of back-barrier marsh. The project would restore bird nesting habitat and

would have long-term major beneficial impacts for bird populations. Given the likely lack of mammals, non-marine reptiles, and amphibians, the project would have no impacts to area populations.

Marine and Estuarine Fauna (fish, shell beds, benthic organisms)

Affected Resources

There are a number of aquatic species found in the project area. Fish species include sand seatrout, spotted or speckled seatrout, searobins, red drum, tonguefish, flounders, Atlantic bumper, and porgys. Benthic organisms include bivalves, gastropods and other mollusks, anemones, amphipods, annelids, brown and white shrimp, and echinoderms.

Environmental Consequences

This project would likely result in short term minor adverse impacts due to construction and dredging-related disturbances and small changes to sessile species populations if present; however, there would likely be no impact to feeding, reproduction, or other factors affecting population levels. Short-term, localized minor impacts to fisheries resources would occur during the construction phase of the project. Mobile aquatic animals would be expected to move away from the fill and borrow sites during construction and return following completion of construction. Isolated, short-term effects on pelagic fish eggs and larvae in the immediate area may occur. Sessile and other limited movement species, especially those buried/burrowed in the substrate could be injured or killed by the dredging activity and the placement of the fill material at the island. However, these types of species are typically numerous in the Gulf and recolonize quickly.

The island and backwater marsh restoration would provide overall long term benefits to marine species by providing additional habitat, increased benthic productivity, and enhanced recruitment and production of fish and crustaceans. Restoration of the tidal marsh habitat would benefit numerous aquatic species and enhance resident fish populations.

The direct effect of dredging is the removal of sediment along with the organisms living in the sediment. Impacts could include entrapment and likely death of slow-moving organisms (such as crabs) and benthic organisms (such as polychaetes) during dredging in the borrow sites and smothering of benthic organisms and more sessile fish species in the deposition sites.

Dredging would change substrate topography, indirectly impacting benthic and other aquatic organisms using this habitat. Depending on the depth-of-cut, dredging in the Gulf could result in low dissolved oxygen in bottom waters. Low dissolved oxygen already occurs in the nearshore Gulf, especially during the summer months, so the site and dimensions of the proposed borrow sites could contribute to localized low dissolved oxygen which may pose a risk to some fish and crustaceans with low mobility.

The project would provide overall long term benefits to marine species by providing additional fish habitat, increased benthic productivity, and enhanced recruitment and production of fish and crustaceans. Restoration of the tidal marsh habitat would benefit numerous aquatic species such as blue crab, red drum and speckled sea trout. Over the life of the project, the quality of fish habitat would increase.

Any adverse impacts to marine and estuarine fauna (fish, shell beds, benthic organisms) are expected to be short in duration and minor as those species that would be affected are likely numerous in the area.

Protected Species

Affected Resources

Protected species and their habitats include Endangered Species Act-listed species and designated critical habitat that are regulated by either USFWS or NMFS. Protected species also include marine mammals protected under the Marine Mammal Protection Act and essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act. The piping plover and red knot (proposed) are the only bird species protected under the Endangered Species Act that utilizes the island for wintering habitat (personal communication from Brian Spears, USFWS, September 2013). Critical habitat for piping plover is designated within the project area.

Five species of endangered or threatened species of sea turtles were identified as possibly being present in the project area: loggerheads, green, hawksbill, Kemp's ridley, and leatherback turtles (Fuller et al. 1987). Sea turtles forage in the waters of coastal Louisiana and likely occur within the project area.

There are 22 different species of marine mammals, including baleen whales, toothed whales, dolphins, and manatees, known to occur in the Gulf of Mexico. The project area is located within the NOAA-defined nearshore estuarine waters to the continental shelf edge (depths of 0-656 feet). Typically whales do not occur in the nearshore waters over the continental shelf of the Gulf of Mexico. Of the 22 species of marine mammals known to occur in the Gulf of Mexico, only three protected species of dolphins commonly occur in nearshore waters (bottlenose, Atlantic spotted, and Risso's).

The bottlenose dolphin inhabits the Gulf of Mexico year round and is the most commonly observed dolphin in nearshore waters. The Atlantic spotted dolphins prefer warm-temperate waters over the continental shelf, edge, and upper reaches of the slope and are very active at the surface. Risso's dolphins are typically found around the continental shelf edge and steep upper sections of the slope (>328 feet in depth) (NOAA 2010).

Of the five listed endangered whale species (sperm whale, sei whale, fin whale, blue whale, humpback whale), only the sperm whale is considered to commonly occur in the Gulf of Mexico. The sperm whale is predominantly found in deep ocean waters, generally deeper than 3,280 feet, on the outer continental shelf. Due to the relatively shallow depth in the project area, the sperm whale, or any other endangered whale, is not likely to be present during construction.

The West Indian Manatee has been observed in Louisiana waters; however, sightings are very rare and almost always occur in coastal bays and estuaries (USFWS 2013b). Manatees, which are an inshore and nearshore species, are not expected to be encountered in the project area, which is 16 miles offshore to the northeast of Venice, Louisiana.

Essential fish habitat consists of waters and substrate that are necessary to Federally-managed fish species for spawning, breeding, feeding, or growth to maturity. Aquatic and tidally influenced wetland

habitats in portions of the Gulf of Mexico surrounding the project area are designated as essential fish habitat (“EFH”) for a variety of federally managed species, including shrimp, red drum, reef fish, stone crab, spiny lobster and coral (NMFS 2013). In addition, several species of shark are known to occur in the proposed project footprint including the following species: scalloped hammerhead shark, finetooth shark, blacktip shark, bull shark, spinner shark, Atlantic sharpnose shark, and blacknose shark. The smooth dogfish, silky shark, yellowfin tuna, and whale shark all have EFH found near the borrow area as well. Detailed information on federally managed fisheries and the EFH is provided in the 2005 generic amendment of the Fisheries Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council (GMFMC 2005). The generic amendment was prepared as required by the Magnuson-Stephens Fishery Management Conservation and Management Act.

Environmental Consequences

The proposed restoration activities would restore dune, shoreline, and interior marsh habitats, thus creating foraging and nesting habitat for birds.

This project would likely result in short term moderate adverse impacts to piping plovers and red knot due to construction and dredging related disturbances. Some birds may leave the area during deployment activities, but would likely return after activities cease. The proposed project would ultimately restore and increase the longevity of the piping plover critical habitat by restoring dune and beach habitat. Best management practices to protect piping plover, red knot, and piping plover critical habitat will be developed during ESA section 7 consultation with USFWS and will be followed during construction.

Whale species in the Gulf are typically found in deeper waters on the outer continental shelf or along the shelf break; therefore, they would not be impacted during the construction activities on the island or the activity at the dredge site. Best management practices regarding sea turtles and other marine mammals developed through consultation with NMFS will be followed during construction. Overall, the rebuilding and restoration of the island should have a positive impact on federally-listed sea turtles such as the hawksbill, green, leatherback, loggerhead, and Kemp’s ridley, which could utilize the area. Long-term adverse impacts to marine mammals or sea turtles would not be anticipated as a result of the proposed project.

This project would likely result in short term minor adverse impacts to EFH due to construction and dredging related disturbances. Some species may leave the area during deployment activities, but would likely return after activities cease. Sessile and other limited movement species, especially those buried/burrowed in the substrate, could be injured or killed by the dredging activity and the placement of the fill material at the island. However, these types of species are typically numerous in these areas. Restoring the island and backwater marsh can enhance resident fish populations. In the long term, project implementation would be beneficial to protecting EFH from erosion and to maintaining the productivity of marine fishery resources. The proposed restoration activities would restore unique and important barrier island habitat, including marsh and wetland habitat, and help maintain a diversity of different categories of EFH throughout the proposed project area and Breton Sound. Although short-term impacts would be anticipated from construction activities, best management practices such as

containment dikes and erosion control measures would be required to lessen short-term construction impacts. The proposed restoration activities would not be expected to cause long-term adverse impacts to diverse categories of EFH. In the long term, project implementation would be beneficial to protecting EFH from erosion and to maintaining the productivity of marine fishery resources.

A list of potential mitigation and Best Management Practices that could be implemented follows.

For example, to reduce potential impacts to the Gulf sturgeon, the cutterhead would remain completely buried in the sediment during dredging operations. The Contractor would be responsible for surveillance, management, and control of their construction activities to minimize interference with, disturbance to, and damage of water, fish, and wildlife resources. The Contractor shall be aware of threatened and endangered species and migratory birds, and implement practices and follow all conditions set forth by NOAA, USFWS, and LDWF to protect these resources. In addition, as appropriate, the “Guidelines for Activities in Proximity to Manatee and Their Habitat” would be followed during all phases of in-water work.

Consultation under the ESA will be initiated with the U.S. Fish and Wildlife Service to evaluate any potential impacts to the federally threatened piping plover and the newly proposed species, red knot.

In addition, the Trustees intend to implement NOAA’s “Measures for Reducing Entrapment Risk to Protected Species,” revised on May 22, 2012 (NOAA 2012). These measures are included below:

Pre-construction planning

During project design, the project proponents will incorporate at least one escape route into the proposed retention structure(s) to allow any protected species to exit the area(s) to be enclosed. Escape routes must lead directly to open water outside the construction site and must have a minimum width of 100 feet. Escape routes should also have a depth as deep as the deepest natural entrance into the enclosure site and must remain open until a thorough survey of the area, conducted immediately prior to complete enclosure, determines no protected species are present within the confines of the structure.

Pre-construction compliance meeting

Prior to construction, project proponents, the contracting officer representative, and construction personnel should conduct a site visit and meeting to develop a project-specific approach to implementing these preventative measures.

Responsible parties

The project proponents will instruct all personnel associated with the project of the potential presence of protected species in the area and the need to prevent entrapment of these animals. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing protected species. Construction personnel will be held responsible for any protected species harassed or killed as a result of construction activities. All costs associated with monitoring and final clearance surveys will be the responsibility of project proponents and will be incorporated in the construction plan.

Monitoring during retention structure construction

It is the responsibility of construction personnel to monitor the area for protected species during dike or levee construction. If protected species are regularly sighted over a 2 or 3 day period within the enclosure area during retention structure assembly, construction personnel must notify the project proponent. It is the responsibility of the project proponent to then coordinate with the NMFS Marine Mammal Health and Stranding Response team (1-877-WHALE HELP [1-877-942-5343]) or the appropriate State Coordinator for the Sea Turtle Stranding and Salvage Network (see http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm) to determine what further actions may be required. Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area.

Pre-closure final clearance

Prior to completing any retention structure by closing the escape route, the project proponent will ensure that the area to be enclosed is observed for protected species. Surveys must be conducted by experienced marine observers during daylight hours beginning the day prior to closure and continuing during closure. This is best accomplished by small vessel or aerial surveys with 2-3 experienced marine observers per vehicle (vessel/helicopter) scanning for protected species. Large areas (e.g. >300 acres) will likely require the use of more than one vessel or aerial survey to ensure full coverage of the area. These surveys will occur in a Beaufort sea state (BSS) of 3 feet or less (measured within the area being closed by the containment), as protected species are difficult to sight in choppy water. Escape routes may not be closed until the final clearance determines the absence of protected species within the enclosure sight.

Post closure sightings

If protected species become entrapped in an enclosed area, the project proponent and NMFS must be immediately notified. If observers note entrapped animals are visually disturbed, stressed, or their health is compromised then the project proponent may require any pumping activity to cease and the breaching of retention structures so that the animals can either leave on their own or be moved under the direction of NMFS.

In coordination with the local stranding networks and other experts, NMFS will conduct an initial assessment to determine the number of animals, their size, age (in the case of dolphins), body condition, behavior, habitat, environmental parameters, prey availability and overall risk.

If the animal(s) is/are not in imminent danger they will need to be monitored by the Stranding Network for any significant changes in the above variables.

Construction personnel may not attempt to scare, herd, disturb, or harass the protected species to encourage them to leave the area. Coordination by the project proponent with the NMFS SER Stranding Coordinator may result in authorization for these actions.

NMFS may intervene (catch and release and/or rehabilitate) if the protected species are in a situation that is life threatening and evidence suggests the animal is unlikely to survive in its immediate surroundings.

Surveys will be conducted throughout the area at least twice or more in calm surface conditions (BSS 3 feet or less - (measured within the area being closed by the containment)), with experienced marine observers, to determine whether protected species are no longer present in the area.

9.6.6 Human Uses and Socioeconomics

9.6.6.1 Socioeconomics and Environmental Justice

Affected Resources

There are no Environmental Justice areas of concern near the project area. Breton Island is part of Plaquemines Parish, Louisiana's most southern parish, where the Mississippi River meets the Gulf of

Mexico. The project area is not located near any urban centers; the closest town is Venice, approximately 18 miles to the southwest, on the west bank of the Mississippi River. There are no incorporated communities anywhere within the Parish. Most of the Parish's population is distributed along a narrow band of land on each bank of the Mississippi River. In 2012, the estimated Parish population was 23,921 and the 2007-2011 median household income was \$55,301 (US Census, 2012). Major sources of employment and income are the seafood industry, off-shore oil industry, shipping, and citrus farming (GNO Inc. 2013). The unemployment rate in Plaquemines Parish in 2012 was 6.5% (LWC 2012). According to the U.S. Census Bureau, approximately 30% of the population of Plaquemines Parish is considered to be minority.

Millions of pounds of shrimp, oysters, crab, and fish are produced annually by the commercial fishing industry in Louisiana. Louisiana's commercial fishing industry catches about 25 percent of all the seafood landed in America and is the largest producer of shrimp and oysters in the United States (Louisiana 2013). In Plaquemines Parish over 5 percent of the population is directly employed in the fishing industry (US Census 2013). Plaquemines Parish is also considered a "sportsman's paradise" for sport fishing (GNO Inc. 2013). Encompassing seventy miles of the Mississippi River, Plaquemines Parish is the eighth largest port in the United States and is noted for exporting coal, petro-chemicals, and grain. The Parish is a major operational center for the offshore oil and gas industry. The oil industry, including production, support, storage, transportation, refining, and petrochemicals is estimated to be a \$1.2 billion industry in Plaquemines Parish. In 2006, employment associated with the oil industry accounted for over 8,000 direct, indirect, and induced employment opportunities, or over 30% of total jobs in the parish (LSU 2006).

In August 2005, the entire Parish was devastated by Hurricane Katrina, which caused extensive structural damages and flooding, major losses to the commercial fishing industry, and a substantial decrease in population primarily due to people not returning to the area after evacuating. Residents are trickling back as housing and other infrastructure are repaired or replaced, but major questions remain about levee protection and the viability of local communities.

Environmental Consequences

Because this project is located offshore, it would have no adverse impacts on the socioeconomic status of the communities and counties adjacent to the project. Minor, short-term beneficial effects could occur from increased employment during project construction. Engineering and design work could employ a number of Federal, State, and/or consultant employees for up to 2 years. The construction crew could consist of 30 to 40 people, who would be employed for a period of 6 to 12 months. These economic benefits would be concentrated in the service and retail industry sectors. Beneficial economic effects would accrue to local recreational supply retailers, restaurants, and hospitality providers.

Environmental Justice Analysis

The relevant demographic data were obtained from the U.S. Census Bureau. Data are presented at the parish level to accommodate the geographic size of each portion of the study area.

In this analysis, a Parish is considered to have a minority population if its nonwhite population is greater than 50 percent or is meaningfully larger than the general (statewide) nonwhite population. Low-income areas are defined as parishes in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater than the general population (average statewide poverty level). To make a finding that disproportionately high and adverse effects would likely fall on minority or low-income populations, three conditions must be met simultaneously:

- There must be a minority or low-income population in the impact zone.
- A high and adverse impact must exist.
- The impact must be disproportionately high and adverse on the minority or low-income population

The Trustees find that this project location does not meet any of the criteria for determining that disproportionately high and adverse effects would likely fall on minority or low-income populations. There is not a minority or low-income population in the impact zone – North Breton Island is uninhabited and Plaquemines Parish as a whole also does not meet these criteria. Furthermore, there is no high and adverse impact anticipated from the proposed project.

9.6.6.2 Cultural Resources

Affected Resources

There are no known historic or cultural resources within the Delta or Breton NWRs (USFWS 2008). In addition, no evidence of archaeological sites has been reported on North Breton Island (Goodwin 1993). The earliest accounts of Breton Island are from French explorations of the area in 1698-1699. It is assumed that any visits to the island were probably brief to collect desired resources because of the harsh living conditions compared to other barrier islands. The island is located near historically documented shipping routes used by the French leading to settlements along the Gulf coast. Because of the shallow waters of Breton Sound, the majority of historic boat use was limited to smaller vessels such as sloops, luggers, and longboats. The navigation history indicates that watercraft of various types have sailed the waters of Breton sound since the arrival of Europeans to the area. There is a potential for historical shipwrecks within the area due to natural and manmade hazards. However, past studies found no evidence of known shipwrecks within the project area (Goodwin 1993).

In 1915, several families and a school were located on Breton Island. Prior to the hurricane of that year, the island was evacuated. The hurricane destroyed the settlement, and it was never rebuilt (USFWS 2013). In addition, there was an oil facility just off of North Breton Island operated by Kerr McGee. The building was destroyed during hurricane Katrina in 2005. Part of a bulk head, well heads, valves and flowlines still remain at the site.

Environmental Consequences

Currently, there are no historic or cultural resources known to exist within the project area (USDOI 2008). It is anticipated that cultural resources would be unaffected by the proposed project. A complete review of this project under Section 106 of the National Historic Preservation Act would be completed as

environmental review continues. This project would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources.

9.6.6.3 Land and Marine Management

Affected Resources

Breton NWR includes North Breton Island and all of the Chandeleur Islands in St. Bernard and Plaquemines Parishes, Louisiana. As federal lands, these islands are not subject to local planning and zoning regulations, but are managed according to the Delta and Breton NWR CCP. As discussed above, management objectives set forth by the CCP are to provide sanctuary for nesting and wintering birds; protect and preserve the wilderness character of the islands; and, provide sandy barrier beach habitat for a variety of wildlife species.

Public use at Breton NWR centers on wildlife viewing and fishing from the beaches and in the shallow water surrounding the islands. Camping on the islands is no longer permitted due to the large amount of land lost to Hurricane Katrina and possible impacts to nesting birds on the remaining habitat. To avoid visitor disturbance to nesting bird colonies, each colony is posted as a closed area during the nesting season; approximately five percent of the islands is used by nesting birds.

Environmental Consequences

Under the proposed project, no changes would occur to the current land use at Breton NWR. Land use and management authority at the refuge would remain under the purview of the US Fish and Wildlife Service, and no development at the site would occur. The proposed project would be consistent with and support the Breton NWR CCP, as it would provide sanctuary for several species of nesting and wintering seabirds and would restore sandy barrier beach habitat.

Pursuant to the Coastal Zone Management Act of 1972, federal activities must be consistent to the maximum extent practicable with the federally-approved coastal management programs for states where the activities would affect a coastal use or resource. Federal Trustees are submitting consistency determinations for state review coincident with public review of this document. Although this project occurs on federal land, which is not part of any state's coastal zone, if it is determined that it can affect a state(s)' coastal use or resource, such a consistency determination will be submitted for this project and activities will take place consistent with the program's requirements.

Therefore, the proposed project would have no impacts to Land and Marine Management.

9.6.6.4 Aesthetics and Visual Resources

Affected Resources

The refuge consists of an island chain starting 16 miles offshore to the northeast of Venice, Louisiana and extending northward toward the Mississippi Gulf Coast for a distance of 70 miles. The general visual character of the area surrounding the refuge can be described as undeveloped. The topography is flat to gently sloping with low-lying marshlands, and land elevations range from 0 to less than 6 feet above sea level. The landscape in the vicinity of the proposed project area is characterized by a mosaic of marsh wetlands, dunes and beaches. There are no designated protected viewsheds in the vicinity of the

proposed restoration activities. Unobstructed views of open water exist from dunes and at higher elevations of the island.

Environmental Consequences

Temporary impacts to visual resources would result from implementation of the proposed restoration activities. Construction equipment would be temporarily visible to visitors and recreational users. These construction-related impacts to visual resources would be minor, since the island is not visible from mainland Louisiana and construction activities and equipment would only be visible to visitors arriving by boat. Because the dune and marsh restoration would consist of the placement of natural sand, silt and clay material, no impacts to visual resources are anticipated as a result of restoration activities. Dune restoration and revegetation is anticipated to result in a long-term minor visual enhancement to the refuge, as the project is intended to mimic the natural processes associated with barrier island formation.

9.6.6.5 Tourism and Recreational Use

Affected Resources

North Breton Island is located within Breton NWR and accessible by boat only. There is no regular commercial boat transport to the island, but charters are available to visitors. Small craft vessels generally reach the southern islands from launches in Venice, Louisiana. Public use includes wildlife viewing and fishing from the beaches and shallow waters surrounding the island. Camping is no longer permitted due to the large amount of land lost to Hurricane Katrina and possible impacts to nesting birds on the remaining habitat. To avoid visitor disturbance to nesting seabird colonies, each colony is posted as a closed area during the nesting season; approximately five percent of the islands is used by nesting birds. Visitor use at Breton NWR is confined mainly to the spring, summer and early fall months, with approximately 2,500 visits per year (USFWS 2013a). North Breton Island is a small portion of Breton NWR; visitor use to North Breton Island is likely lower than for the rest of the refuge.

Environmental Consequences

During the construction period, the visitor recreational experience would be adversely impacted by noise and visual disturbances associated with the use of construction equipment. Access to waters surrounding the island would potentially also be restricted during dredging activities. While these temporary inconveniences would result in minor adverse impacts on tourism and recreational use, over the long term the project would result in minor beneficial impacts to tourism and recreational use. Opportunities for recreational activity at the shoreline would be enhanced as a result of improved fishing and bird watching opportunities accruing from improved habitat conditions. The implementation of the proposed project would not be expected to result in an increase in the number of visitors, due to the island's small size and its distance from shore; however, the project would contribute positively to improvements in the quality of the visitor experience. Overall, adverse impacts to tourism and recreational use would be short term and minor. Over the long term the project would result in minor beneficial impacts to tourism and recreational uses.

9.6.6.6 Infrastructure

Affected Resources

Breton Island is a remote barrier island with no services or infrastructure. It is not located near any urban centers; the closest town is Venice, approximately 18 miles away and across the Mississippi River. Pipelines and other infrastructure associated with offshore oil production are present throughout Breton Sound and the Gulf of Mexico. While no pipelines are known to lie within the anticipated restoration footprint, several known, existing pipelines and facility infrastructure cross the area of the proposed borrow sites as shown in Figure 9-14. Magnetometer surveying within the target borrow area and associated conveyance corridors, access channels, and project fill areas will be conducted as part of project engineering and design before construction activities begin to better delineate these structures.

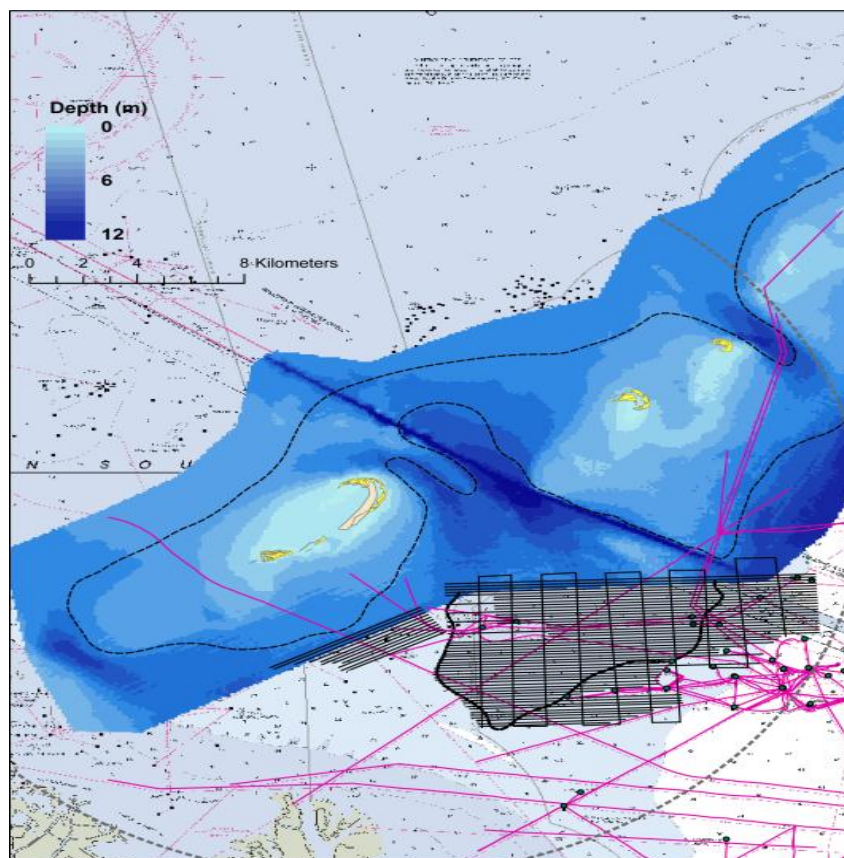


Figure 9-14. Project area, showing known pipeline infrastructure.

Environmental Consequences

The project would not impact utility, transportation, or other infrastructure associated with urban development, as no such infrastructure exists on North Breton Island and no development is proposed. Existing oil production facilities and pipelines would not be impacted, as these would be identified and avoided during construction. Therefore, the proposed project would have no impacts to infrastructure.

9.6.6.7 Public Health and Safety

Affected Resources

The management of hazardous materials is regulated under various federal and state environmental and transportation laws and regulations, including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Emergency Planning and Community Right-to-Know Act, the Hazardous Materials Transportation Act, and the Louisiana Voluntary Investigation and Remedial Action statute. The purpose of the regulatory requirements set forth under these laws is to ensure the protection of human health and the environment through proper management (identification, use, storage, treatment, transport, and disposal) of these materials. Some of these laws provide for the investigation and cleanup of sites that have already been contaminated by releases of hazardous materials, wastes, or substances.

A review of the US Environmental Protection Agency EnviroMapper revealed no known sources of contamination or hazardous materials located on or immediately adjacent to North Breton Island (EPA 2013b). However, numerous oil and gas facilities exist within Breton Sound. Oil and gas facilities are subject to chemical releases that may have the potential to affect the site.

Environmental Consequences

Project deployment would use mechanical equipment, boats, and barges that use oil, lubricants and fuels. The contractor would be required to take appropriate actions to prevent, minimize, and control the spill of construction related petroleum or hazardous materials such as vehicle fuels, oil, hydraulic fluid, and other vehicle maintenance fluids, and to avoid releases and spills. If a release should occur such releases would be contained and cleaned up promptly in accordance with all applicable regulations. As a result, no impacts associated with construction-related petroleum or hazardous materials would be anticipated.

Although numerous oil and gas pipelines and wellheads are present in the area, the probability of impacts related to petroleum or hazardous materials is low provided that care is taken not to disturb these pipelines. The principal impacts of the proposed project on public health and safety would be related to the potential mobilization of hazardous waste from excavation and handling of sediments containing oil, heavy metals, or other materials, which could result in exposure to the environment and workers. Sediment analysis would be completed prior to project implementation. If hazardous materials are encountered in the project area during construction activities, appropriate measures for the proper assessment, remediation, management, and disposal of the contamination would be required in accordance with applicable federal, state, and local regulations.

Because of the nature and location on the project, no impacts to public health and safety, or shoreline erosion are anticipated as a result of construction and dredging activities to rebuild and re-establish dunes and wetlands. The project and its construction are not anticipated to generate hazardous waste or the need for disposal of hazardous waste. In the event of a fuel or oil spill from the vessels or equipment, all procedures, regulations and laws pertaining to Oil Spill Prevention and Response would be adhered to and the incident would be reported to appropriate agencies. All occupational and marine

safety regulations and laws would be followed to ensure safety of all workers and monitors. Therefore, public health and safety would be unaffected by the proposed project.

9.6.7 Summary and Next Steps

Draft NEPA analysis of the environmental consequences suggests that minor adverse impacts to some resource categories and no moderate to major adverse impacts are anticipated to result. Based on initial designs, the project would provide long-term benefits by restoring more than 300 acres of beach, dune, and back-barrier marsh habitats at the North Breton Island barrier island location in Louisiana. The Trustees have started coordination and reviews under the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Historic Preservation Act, the Marine Mammal Protection Act, the Bald and Golden Eagle Protection Act, Coastal Zone Management Act, and other federal statutes. The Trustees will consider public comment and information relevant to environmental concerns bearing on the proposed actions or their impacts. As described in Section 9.2.7, the North Breton island barrier location is part of the Louisiana Outer Coast Restoration project which is consistent with Alternative 2 (Contribute to Restoring Habitats and Living Coastal and Marine Resources) and Alternative 4 (Preferred Alternative). Final determination on this project (Louisiana Outer Coast Restoration) will be included in the final Phase III ERP/PEIS and Record of Decision.

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Personal Communications

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9.7 Louisiana Marine Fisheries Enhancement, Research, and Science Center: Project Description

9.7.1 Project Summary

The Louisiana Marine Fisheries Enhancement, Research, and Science Center (“the Center”) would establish state of the art facilities to responsibly develop aquaculture-based techniques for marine fishery management. The proposed project would include two sites (Calcasieu Parish and Plaquemines Parish) with the shared goals of fostering collaborative multi-dimensional research on marine sport fish and bait fish species; enhancing stakeholder involvement; and providing fisheries extension, outreach, and education to the public. The estimated cost for this project is \$22,000,000.

9.7.2 Background and Project Description

Development of the Center would support the State of Louisiana’s ongoing efforts to manage recreational fishery resources by establishing the state’s first marine fish hatchery facility, and developing public venues for marine fishery educational activities. Fish produced at the Center would be utilized for a variety of research projects, including the targeted release of small numbers of marked sport fish species to study Louisiana’s recreational fishery. The Center would allow the Louisiana Department of Wildlife and Fisheries (“LDWF”) to incorporate aquaculture technology and outreach venues as tools for marine fisheries management, and involve stakeholders through educational opportunities.

9.7.2.1 Calcasieu Parish Facility

The primary location for the Center would be at a site near the north end of Lake Calcasieu, and south of the city of Lake Charles (Figure 9-15). The proposed facility includes construction of a multi-purpose building and pond complex to be used for marine fisheries research, production, education, and outreach. The building will house multiple components including a visitor center, support space for staff and collaborating researchers, and a hatchery complex.

The public visitation and outreach components of the facility would provide dedicated space for public education on fisheries management activities and restoration programs, and would include a reception area, educational exhibits, display aquaria, marine animal touch tank, visitor restrooms, and a youth fishing pond. The support areas of the building would include administrative and staff offices, meeting rooms, dormitory, crew support areas, two laboratories, feed storage and preparation, maintenance shop, and equipment storage rooms.

The hatchery complex would be focused on the production of spotted seatrout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), and southern flounder (*Paralichthys lethostigma*). The indoor hatchery components would employ the use of modern recirculating aquaculture systems (“RAS”) technology to provide the required controlled systems needed for year round production capability. The production pond complex would consist of three 0.5-acre multi-purpose rearing ponds. To support these systems, the facility would include a salt water intake, pump station and pipeline, a water reservoir pond and storage tanks, a freshwater well, and effluent treatment ponds.

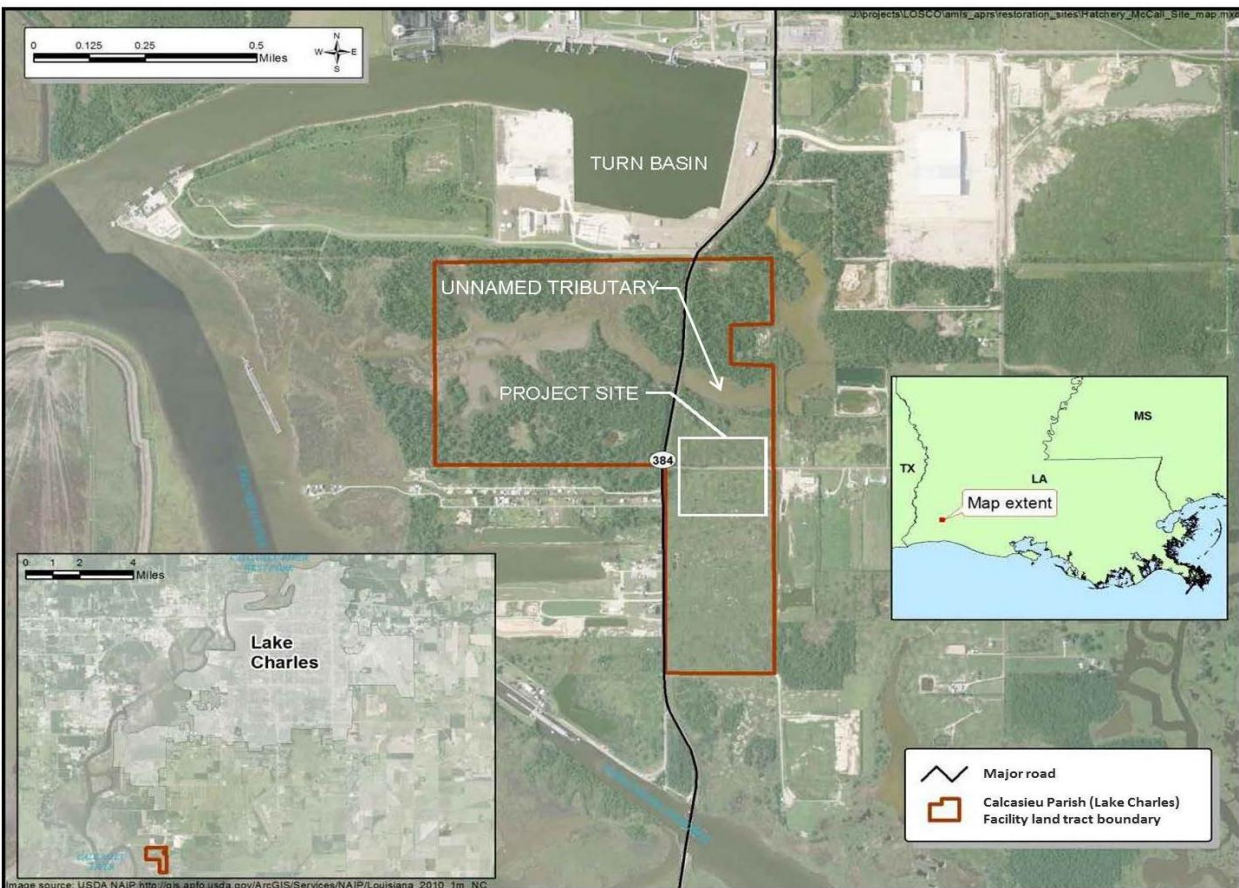


Figure 9-15. Location of the Calcasieu Parish site.

9.7.2.2 Plaquemines Parish Facility

A second facility would be located in Plaquemines Parish, northwest of West Pointe à la Hache (Figure 9-16). This facility would serve as a research and demonstration facility for marine baitfish in support of recreational sport fishing. The species of fish proposed are the Gulf killifish (*Fundulus grandis*) and the Atlantic croaker (*Micropogonias undulatus*). At this site, the project would involve constructing a multi-purpose building and renovating/reconditioning existing onsite facilities. As currently proposed, the constructed building would house a staff office, crew support and baitfish culture area with small-scale RAS to support research and demonstration of technology for marine baitfish husbandry. Existing onsite facilities that were previously used for plant propagation would be renovated or reconditioned, including a Mississippi River water intake structure and pumping station, infrastructure components (e.g., water pipelines, access roads), and ponds for research, effluent treatment, and water storage. The facility would help develop and improve techniques for marine baitfish holding and production systems, which would be demonstrated and disseminated to improve access to live bait for recreational fishing in Louisiana.

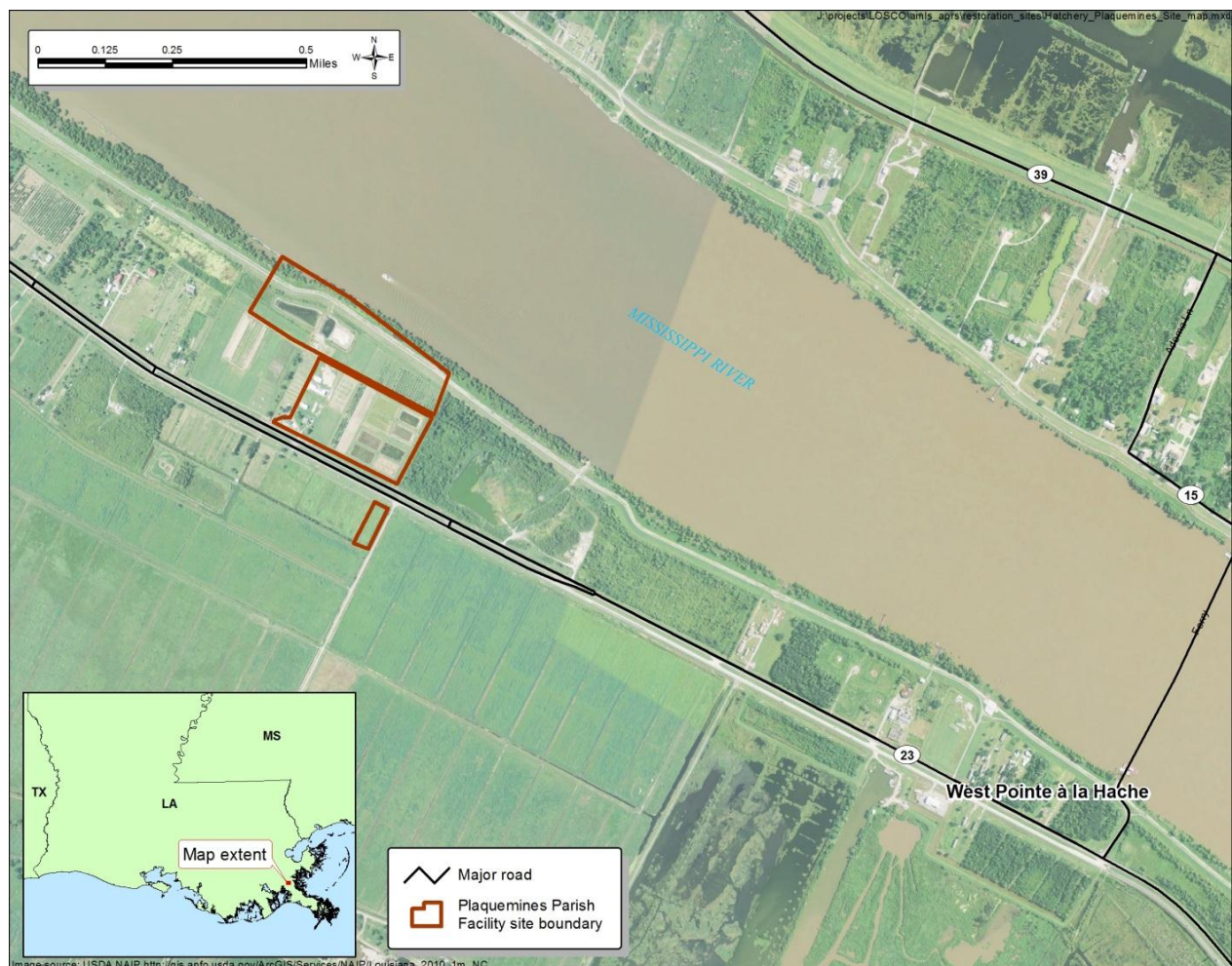


Figure 9-16. Location of the Plaquemines Parish satellite facility.

Hatchery Operations

The operating plans at both locations would be guided by species-specific best management practices (“BMPs”) addressing fish husbandry and spawning, live food production and larval rearing, as well as production systems for growing fish to desired sizes. Fish grown at the hatchery facilities would be used for a variety of research projects.

Wild caught brood fish would be collected, acclimated, and conditioned to spawn using temperature and photoperiod manipulation of holding systems. Fertilized eggs would be collected, enumerated, and incubated in dedicated tanks. The resulting larvae would either be fed live foods (e.g., rotifers, artemia) in larval-rearing systems, or stocked in outdoor systems which provide a natural source of zooplankton for forage. Juvenile fish would be reared in a combination of tank and/or pond systems utilizing natural and artificial diets (e.g., zooplankton, forage fish, commercially available feeds, and research diets).

Sport fish produced at the Center would be used for the long-term monitoring of Louisiana’s fishery resources and the habitats that support them. The production and release of marked hatchery fish will be carried out in conjunction with LDWF’s statewide fishery monitoring program. Initial releases of

marked, hatchery-produced sport fish will be targeted experimental stockings to investigate ecological hypotheses and evaluate release strategies (spatial and temporal variation, fish size, marking techniques).

9.7.3 Evaluation Criteria

The Trustees evaluated the project based on the evaluation criteria described in Chapter 2 and the additional RRP Program-specific criteria described in the introduction to this chapter. The project would enhance the public's use and/or enjoyment of natural resources, helping to offset adverse impacts to such uses caused by the Spill. The nexus to resources injured by the Spill is clear. See C.F.R. § 990.54(a)(2); and 6(a)-(c) of the Framework Agreement. Recreational fishing in Louisiana was adversely impacted by the Spill, as widespread closures of areas for recreational fishing were necessary because of oil and clean-up/response activities. The objective of this restoration project is to help compensate for the loss of recreational fishing services resulting from the Spill by constructing and operating the facilities described above to support and improve the State of Louisiana's management of marine fishery resources (via the production of sport and bait fish and associated research) as well as public education and outreach.

The designs for the Center are technically feasible and based on proven techniques and established methods used in other fish hatchery and research center projects. See 15 C.F.R. § 990.54 (a)(3); and 6(e) of the Framework Agreement. The project could be developed at a reasonable cost and implemented with minimal delay, as the State of Louisiana has already engaged in significant work associated with planning and permitting for the Center that demonstrates the project's feasibility and high likelihood of success. See 15 C.F.R. § 990.54 (a)(1), (a)(3); RRP Program FPEIS (NOAA et al. 2007b, p. 104); and 6(e) of the Framework Agreement. The project supports existing restoration strategies and is consistent with anticipated long-term restoration needs because it will improve scientific understanding of the fishery resource in Louisiana. See RRP Program FPEIS (NOAA et al. 2007b, p.104); and 6(d) of the Framework Agreement.

9.7.4 Performance Criteria, Monitoring, and Maintenance

Construction monitoring will be done before, during, and in a subsequent period following construction to ensure that project designs are correctly implemented. Successful implementation of this restoration project will be measured by (1) the completion of construction of the facilities and (2) the operations of the facilities as anticipated. LDWF will monitor the operations of the Center in multiple ways, including documenting compliance with all permitting requirements, monitoring the operational status of the hatchery components, and monitoring the number of fish produced and released annually. The Center is also designed as an education and outreach facility, so the number and types of visitors (e.g., tourists, school groups) to the facilities will be recorded.

The facilities at both Center locations are designed as research facilities, so there will be ongoing scientific efforts to optimize hatchery performance, including monitoring the effects of different protocols on outcomes. The production and release of marked hatchery fish are intended to be carried out in conjunction with LDWF's statewide fishery monitoring program and will help develop and

evaluate strategies for the management of marine fish species by providing information on the recruitment, survival, health, and movements of these populations.

Maintenance and staffing of the facilities will be the responsibility of LDWF and will be done as specified in the design plans for the Center.

9.7.5 Offsets

NRD Offsets are \$33,000,000 expressed in present value 2013 dollars, based on a benefit-to-cost ratio of 1.5, to be applied against the monetized value of lost recreational use provided by natural resources injured in Louisiana, which will be determined by the Trustees' assessment of lost recreational use for the Spill. See Chapter 7 of this document (Section 7.2.2) for a description of the methodology used to develop monetized Offsets.⁴

9.7.6 Cost

The total estimated cost to implement this project is \$22,000,000. This cost reflects estimates developed from the most current information available to the Trustees at the time of the project negotiation. The cost includes provisions for planning, engineering and design, construction, monitoring, and potential contingencies.

⁴ For the purposes of applying the NRD Offsets to the calculation of injury after the Trustees' assessment of lost recreational use for the Spill, the Trustees and BP agree as follows:

- The Trustees agree to restate the NRD Offsets in the present value year used in the Trustees' assessment of lost recreational use for the Spill.
- The discount rate and method used to restate the present value of the NRD Offsets will be the same as that used to express the present value of the damages.

9.8 Louisiana Marine Fisheries Enhancement, Research, and Science Center: Environmental Review

9.8.1 Introduction and Background

In response to the Spill, a Gulf Coast region-wide Early Restoration effort is underway to address the impacts of the Spill on natural resources and on associated lost human uses of those resources. The Center is a component of that effort, and is intended to address a portion of the recreational uses lost as a result of the Spill. The Center would include development of two sites in Louisiana – one in Calcasieu Parish and one in Plaquemines Parish – that would support the State of Louisiana’s ongoing management of its saltwater sport fishery. The proposed facilities would support research, hatchery production of sport fish and baitfish, and public education and outreach. The proposed project would provide state-of-the art facilities for collaboration with stakeholders and for rearing fish for research projects. Fish produced at the proposed Calcasieu Parish facility would be marked and released in conjunction with the existing Louisiana Department of Wildlife and Fisheries (LDWF) marine fisheries monitoring program. This work would provide information on recruitment, survival, health, and movements of marine fish populations, which would be used to help develop and evaluate strategies for the management of Louisiana’s saltwater sport fishery. Additionally, staff and researchers at the proposed Plaquemines Parish facility would conduct and disseminate the results of research on marine baitfish production and holding techniques. The Center would also serve as a venue for public outreach and educational activities concerning marine habitats and ecosystems, as well as related fisheries management and conservation issues.

9.8.1.1 Calcasieu Parish Facility

The proposed Calcasieu Parish facility would function as the main location for the Center. The primary function of the facility would be for research on, production of, and education about marine sport fish species including red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), and southern flounder (*Paralichthys lethostigma*). Fish produced at the facility’s hatchery would be used for long-term monitoring of the fishery resources and the habitats that support them. The facility would also house a visitor complex to provide education and outreach on Louisiana’s fisheries and marine ecosystems.

9.8.1.2 Plaquemines Parish Facility

The proposed Plaquemines Parish facility would serve as a secondary location for the Center. The primary function of the facility would be for marine baitfish research. The proposed species for this research would be the Gulf killifish (*Fundulus grandis*) and the Atlantic croaker (*Micropogonias undulatus*). This facility would operate as a demonstration site for research and education activities regarding effective marine baitfish holding and culture systems.

9.8.2 Project Location

9.8.2.1 Calcasieu Parish Facility

The proposed Calcasieu Parish facility site is located on a 320.5-acre privately-owned tract of land north northeast of Lake Calcasieu and south of Lake Charles, near the Calcasieu River. The proposed facility site would occupy a small portion of the full tract (Figure 9-17). LDWF would negotiate an appropriate

long-term land use arrangement with the landowner as part of the final project design and permitting process.

The tract is located in Sections 16 and 21, T11S, R9W (Figure 9-17). The tract is transected from north to south by Big Lake Road and from west to east by Joe Ledoux Road. An unnamed tributary to the Calcasieu River crosses the northern end of the tract from west to east. The latitude/longitude of the tract is 30.097313° N, 93.288029°W (NAD83).

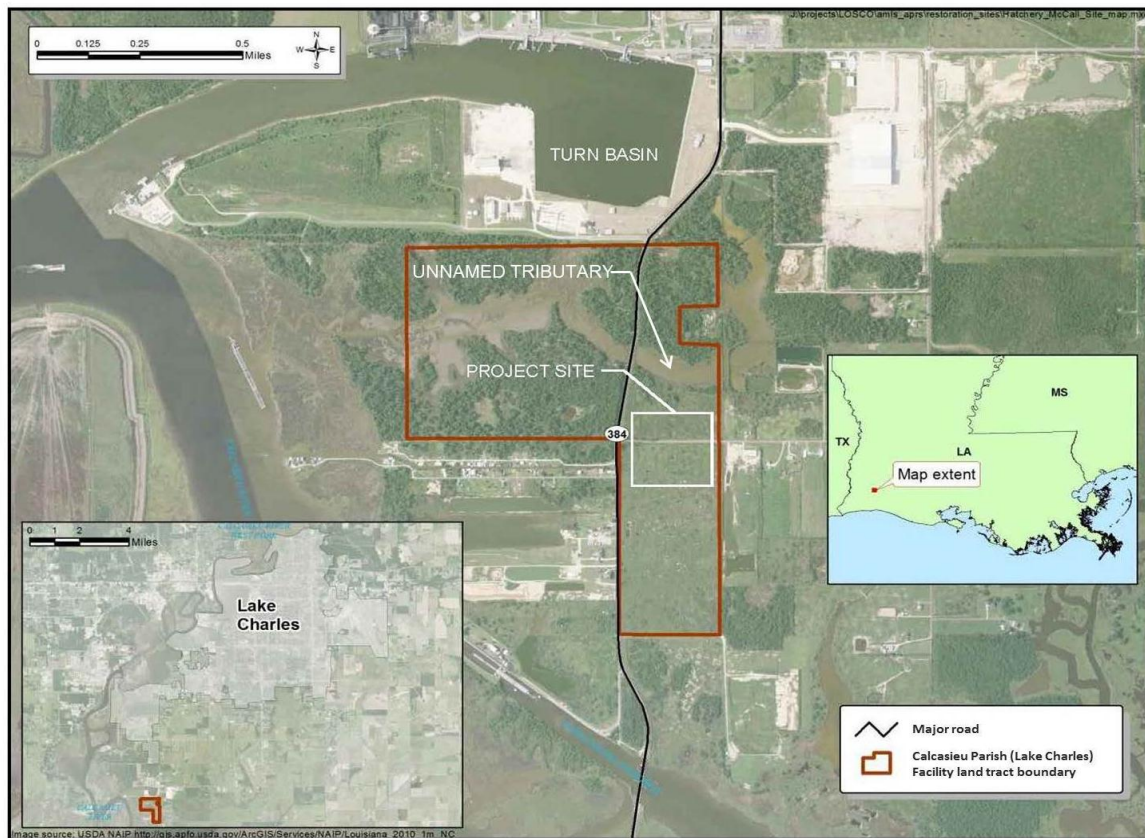


Figure 9-17. Vicinity map for the proposed Calcasieu Parish facility. The area labeled as “project site” encompasses where the buildings and ponds are expected to be situated.

The tract of land proposed for the Calcasieu Parish facility lies just outside the boundary of the Louisiana Coastal Zone, although it is mapped within the 100-year floodplain. The property is currently undeveloped and privately owned. Its natural land features include emergent wetlands, mima mounds, bayous, and forested wetlands, and the land is hydrologically connected to surrounding streams, bayous, rivers, and lakes. The wetlands within the boundary of the tract have likely been degraded by activities such as channelization, drainage, levees, logging, pumping and past cattle grazing. Surrounding land uses are primarily residential and industrial. There are no schools, churches, cemeteries, hospitals, or other public buildings located on or immediately adjacent to the tract of land proposed for the facility. According to historical records, Benoit Cemetery was originally located in the northern section of the tract, but this cemetery was relocated off the site in 1963. The Lake Charles Regional Airport is approximately 3.8 miles east of the proposed facility site.

9.8.2.2 Plaquemines Parish Facility

The proposed Plaquemines Parish facility site is located near the community of West Pointe à la Hache, on property previously leased by the Louisiana State University Agricultural Center (LSU AgCenter) from Plaquemines Parish. The former LSU AgCenter Coastal Area Research Station used the site for research on citrus and coastal plant propagation (Figure 9-18), and when it closed in 2011 the site ownership reverted back to Plaquemines Parish. LDWF would negotiate an appropriate long-term land use arrangement with the Parish as part of the final project design and permitting process. The property is bordered to the east by the Mississippi River, to the north by private property, to the west by Belle Chasse Highway (LA 23), and to the south by private property. Plaquemines Parish currently owns the property. The latitude/longitude is 29.579955°N, -89.820681°W (NAD83).

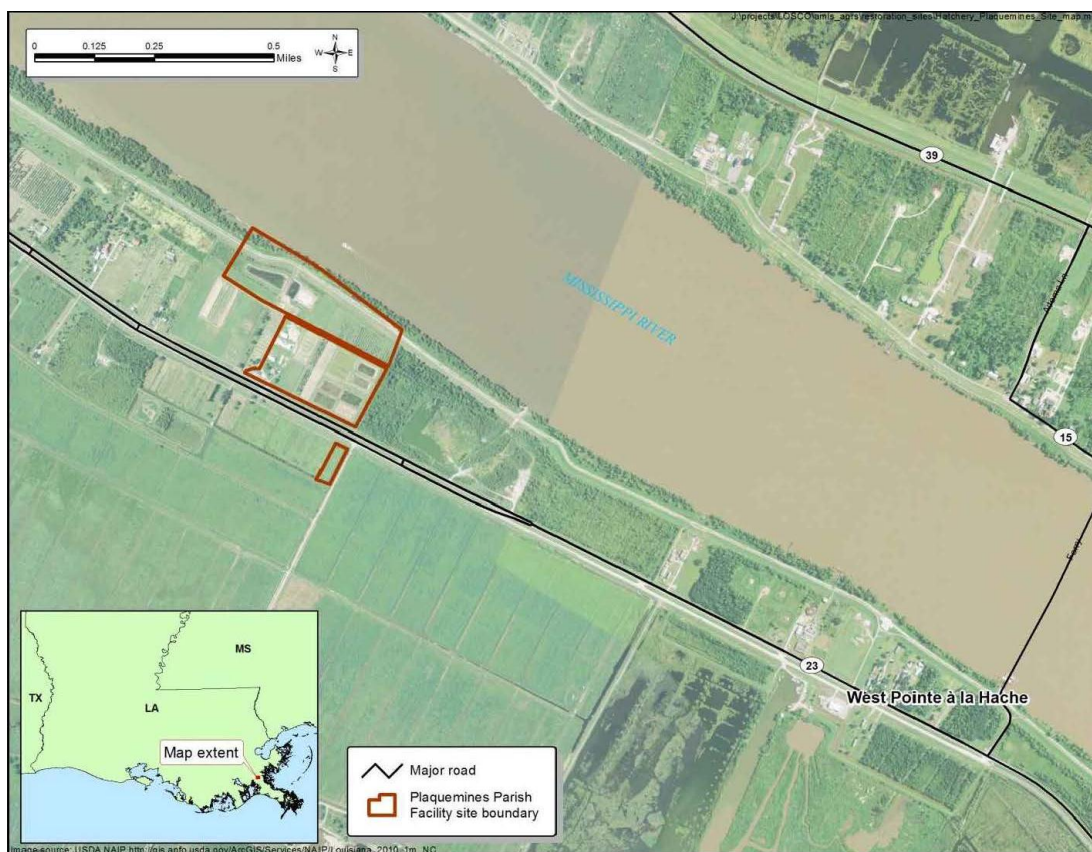


Figure 9-18. Vicinity map for the Plaquemines Parish facility.

Project activities are proposed to occur in a “fastland” area⁵ that is protected by levees. This location lies within the Louisiana Coastal Zone and is mapped within the 100-year floodplain. The site has been impacted by development, land modification, and recent hurricanes and has been primarily used for industrial, agricultural, and residential purposes. Currently, the site is used by Plaquemines Parish as a

⁵ According to the Louisiana Office of Coastal Management, “fastlands” are lands surrounded by publicly-owned, maintained, or otherwise validly existing levees or natural formations as of Jan. 1, 1979, or as may be lawfully constructed in the future, which prevent activities, not to include the pumping of water for drainage purposes, within the surrounded area from having direct and significant impacts on coastal waters.”

(<http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=420>, Accessed Aug. 28, 2013).

receiving location for processing piles of earthen material that will be distributed and graded across the site after it is dried. The existing ponds will not be affected by this work.

9.8.3 Construction and Installation

9.8.3.1 Calcasieu Parish Facility

The proposed Calcasieu Parish facility would require construction of a multi-purpose building and pond complex to be used for marine fisheries research and production as well as public education and outreach (Figure 9-19). The facility would also require construction of a water supply system, including: 1) an intake and pump station that would pump water from the Turn Basin, an offshoot of the Calcasieu shipping canal (see Figure 9-17 for location of Turn Basin); 2) buried pipelines for water intake and effluent; and 3) an outfall structure for release of treated effluent, currently proposed for the unnamed tributary (see Figure 9-19 for location of unnamed tributary).



Figure 9-19. Proposed site plan for the Calcasieu Parish facility.

The elevated building is envisaged to be approximately 175ft x 134ft (23,450 ft²) containing an internal drive thru corridor and would include covered porches and six exterior stair systems for ingress and egress. It would be designed as a concrete, pier-supported structure located above base flood elevation and engineered to meet hurricane wind design standards. The building would be equipped with emergency systems to help protect staff and continue operations during severe weather events.

As currently proposed, the multi-purpose building would contain a hatchery, visitor center, dormitory, administrative and staff offices, meeting rooms, crew support areas, two laboratories, covered access

corridor, maintenance shop, and equipment storage rooms (Figure 9-20). The hatchery would employ the use of modern RAS technology needed to provide the required indoor, controlled-environment fish production systems for year-round production capability. The hatchery portion of the building would be located immediately adjacent to the administrative and staff offices and crew support areas. Access to the hatchery production area would be accommodated by a 12-foot wide internal drive aisle with entry and exit ramps used to facilitate vehicle transport of fish and equipment to the elevated building. The visitor center is proposed as a 2,100 ft² dedicated space for public education on marine fisheries and restoration programs. This area would likely include a reception area, educational exhibits, display aquaria, marine animal touch-tank, and visitor restrooms.

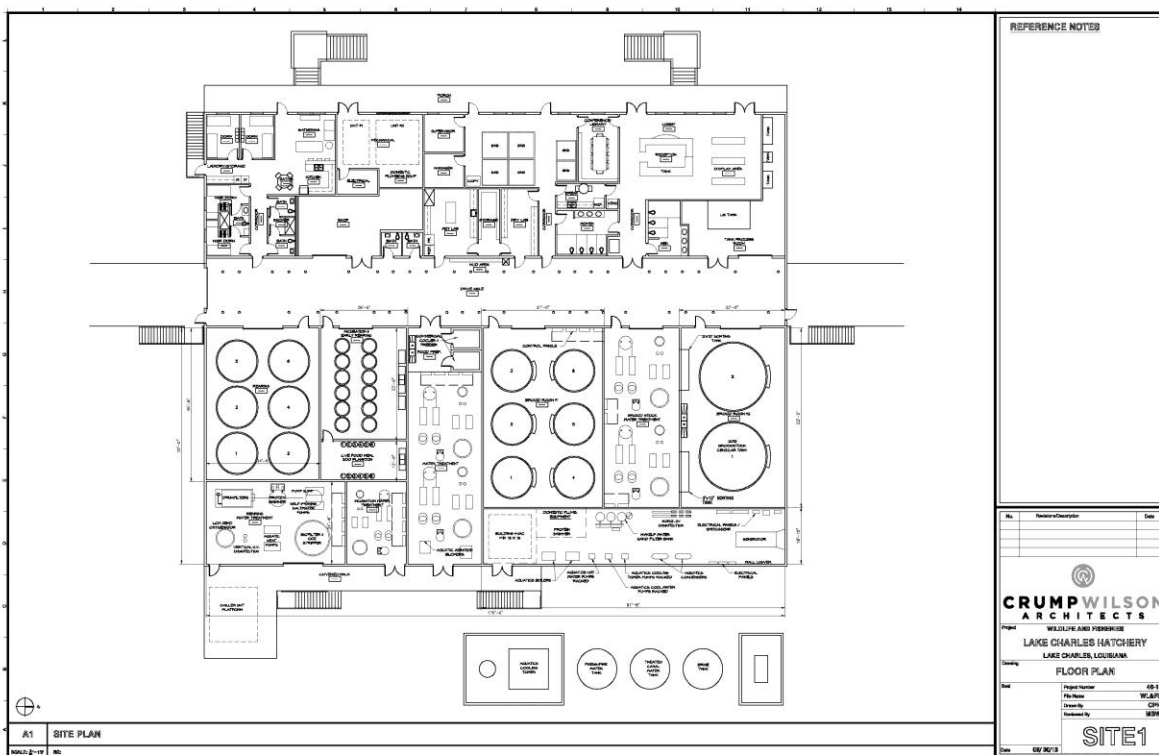


Figure 9-20. Proposed floor plan for Calcasieu Parish multi-purpose building.

The proposed facility would also include a pond complex consisting of a lined saltwater storage reservoir, three lined multi-purpose rearing ponds, and two lined effluent treatment ponds, as well as a youth fishing pond to the west of the multi-purpose building (see Figure 9-19). Each pond would be 0.5 surface acres in size, except the visitor fishing pond, which would be approximately one acre. The ponds would be constructed using compacted earthen dikes and synthetic pond liners to control seepage and improve pond fish rearing operations. Construction fill material would be obtained from existing borrow areas at or adjacent to the facility. Ponds would be equipped with concrete outlet structures and fish harvest basins (kettles), and would employ plastic piping for supply and drainage.

Grading and Ground Disturbance

The proposed facility, including the buildings, pond complex, and youth fishing pond, would be built on approximately 12 acres east of Big Lake Road. The excavation or placement of structures within or on soils would require a geotechnical evaluation to determine design and construction methodology. At a minimum, this evaluation would apply to ponds, buildings, pipelines, intake structures, and access roads. Further details are provided below.

Buildings

Multi-Purpose Building: Construction of the multi-purpose building (and associated parking areas) would impact approximately 4 acres and include clearing and grading of undeveloped land.

Storage Building: A pre-engineered storage building (3,200 ft²) would be located near the production ponds. Construction of the building would require clearing and grading of undeveloped land.

Emergency Backups: In the event of a storm, the facility would have a backup generator(s) with the capacity to run the administrative area and hatchery until normal utilities could be restored. The emergency generator(s) would be sized to handle the entire energy load for the site and are anticipated to be powered from natural gas, accessing a nearby natural gas main line. Automatic transfer switches would be installed at the hatchery building to automatically transfer the load to the generator in the event of power outage. Liquid oxygen systems would also be used to oxygenate fish systems in the event of power outages.

Ponds

Fish Production Ponds: Construction disturbances for the rearing ponds would include clearing and grading of undeveloped land for pond complex construction. There would be a total of three fish production ponds, each approximately 0.5-acre in size. The pond depths would slope from 3 to 6 feet deep. The ponds would be constructed using compacted earthen dikes and an impermeable membrane such as an EPDM rubber pond liner for seepage control and improved pond fish rearing performance. Excavation of 2-4 feet of soil would be anticipated pending results of the geotechnical evaluation. The ponds would require an under-drain system to discharge groundwater and gases away from the bottom of the ponds. Fill material for construction would be obtained from existing borrow areas, either on site or immediately adjacent to the site. Water supply would be provided for each pond, which would require excavation, trenching and backfilling to install pipelines. The pond water supply system would include a fully-looped piping system to provide deep end and shallow end water delivery. Isolation valves and system drains would also be provided within the water supply piping system for ease of maintenance. Each pond would be equipped with a concrete interior "U-shaped" fish harvest kettle, concrete outlet structure, and a concrete kettle access stairway. The pond drainage would also require pipeline excavation, trenching and backfilling.

Youth Fishing Pond: The youth fishing pond would require excavation of approximately one acre and the installation of compacted levees. The stock species, water supply, and design concepts for this pond would be developed following preliminary design.

Water Supply System

Intake and Pump Station: As proposed, the building and ponds at the Calcasieu Parish facility would receive water from the Turn Basin, approximately 0.5 mile north of the site (Figure 9-17). The Turn Basin is an offshoot of the Calcasieu shipping canal located outside of the coastal zone. Water would flow by gravity from the Turn Basin through an intake screen into a concrete sump adjacent to the Turn Basin. Pumps within the sump would provide canal water to the building and ponds. The pump station would include a multiple submersible or line shaft turbine pump system using variable frequency drive controlled motors. The proposed pump station capacity would be designed to accommodate pond filling and pond operation and to service the requirements of the building. Total water flow requirements would be anticipated to vary throughout the year based on seasonal production. The estimated flow rate would range between 500 and 1,000 gpm. All buried pipe would be installed using an open trench method.

Well: Two new wells would be drilled to accommodate fish production and facility needs. A 300 gpm well would be drilled (depth unknown at this time) to serve as a production well. The well water would be used to adjust salinity of culture water, to treat marine fish parasites, and for general facility operations. In addition, a domestic well would be drilled to meet potable water needs for the facility (depth and flow-rate unknown at this time). Regional groundwater yields reflecting State and Parish well records would be used to develop these wells. Actual depths would be determined based upon well driller data and associated testing.

Pipeline: The water supply pipeline would be a buried, 10-inch pipeline that would extend between the pump station and the building, the saltwater supply pond, and the production ponds. The ponds and building would also receive water from the new production process well located on the facility grounds. All buried pipe would be installed using an open trench method.

Saltwater Reservoir Pond: This 0.5-acre pond would be used for water storage, solar warming, and rapid pond filling. The reservoir would be lined with an impervious membrane for erosion control, seepage containment, and water quality maintenance. The pond would also function as a backup water supply when pumping station is non-operational (pump service, power outage).

Water Storage Tanks: Three insulated fiberglass tanks would be located adjacent to the visitor/hatchery building to store water for use in the RAS and water supply systems. The three 15,000 gallon tanks would hold: 1) fresh water (available also for fire safety), 2) treated Turn Basin water, and 3) manufactured brine water for salinity adjustments.

Effluent System

Effluent Ponds: Two ponds would be constructed for treatment of effluent from the building and rearing ponds. These ponds would be approximately 0.5 acres and would be constructed using the same methods used for the production ponds. These ponds would incorporate drainage structures that are used to dry the ponds for sediment removal. The two ponds would alternate in usage to facilitate sediment removal. To remove excess nutrients from discharge water, the final design process will

determine the appropriateness of using multi-trophic integrated aquaculture in conjunction with the effluent ponds, or potentially with adjacent constructed wetlands.

Discharge Pipeline: Discharge from the effluent ponds would flow via buried 24-inch pipe to an unnamed tributary of the Intracoastal Waterway approximately 1,000-feet to the north. All buried pipe would be installed using an open trench method.

General Sitework

Site Drainage: Existing site drainage would be evaluated to determine capacity during storm events. Additional drainage and grading would be required where construction activities occur. Culverts and ditches would be upsized, as needed. Site-specific drainage calculations would be evaluated during the design process.

Roads and Parking: Road construction would involve an additional 130 feet of paved two-lane road and 130 feet of additional paved single-lane road. Pedestrian sidewalks around the building and parking lot would be constructed, as appropriate. The pond complex would include construction of an additional 150 feet of paved two-lane road and about 3,300 feet of 12-foot wide aggregate road around the pond perimeters.

Mobilization, Staging and Stockpiling

Temporary staging areas for materials, supplies, equipment, and a contractor office trailer would be located within the proposed site boundary. Base aggregate, asphalt, concrete, pipe, building components, earthen pond fill material, liners, and all building equipment would be delivered to the site. Construction access to the facility would be from Joe Ledoux Road. Construction crews would include a general contractor and subcontractors for earthwork, building construction (plumbing, HVAC, electrical), pond lining, and other specialty trades. Estimated crew sizes would range between 10 and more than 50 persons depending on the type of work and the stage of project construction.

9.8.3.2 Plaquemines Parish Facility

The Plaquemines Parish facility site was severely impacted by Hurricane Isaac in 2012 and the majority of the existing pumps, water lines, buildings, greenhouses and storage facilities were damaged. At this facility, construction would include rehabilitation of existing ponds, pumping stations, water lines, and access roads, and the addition of a new elevated building (Figure 9-21).

The proposed multi-purpose building would be a concrete, pier-supported structure located above the base flood elevation, and designed to meet hurricane wind design standards (Figure 9-22). The building dimensions, as currently proposed, would be approximately 60ft x 40ft (2,400 ft²) and of similar construction to the proposed Calcasieu Parish facility building described above. The building would be elevated approximately 12 feet above ground level with an access ramp for vehicles, and would contain a staff office, crew support area, and a baitfish culture area. The administrative portion of the new structure would consist of offices, a conference room and crew support areas. Production areas would include space for tank systems, water processing, and storage and preparation.



Figure 9-21. Site plan for the Plaquemines Parish facility.

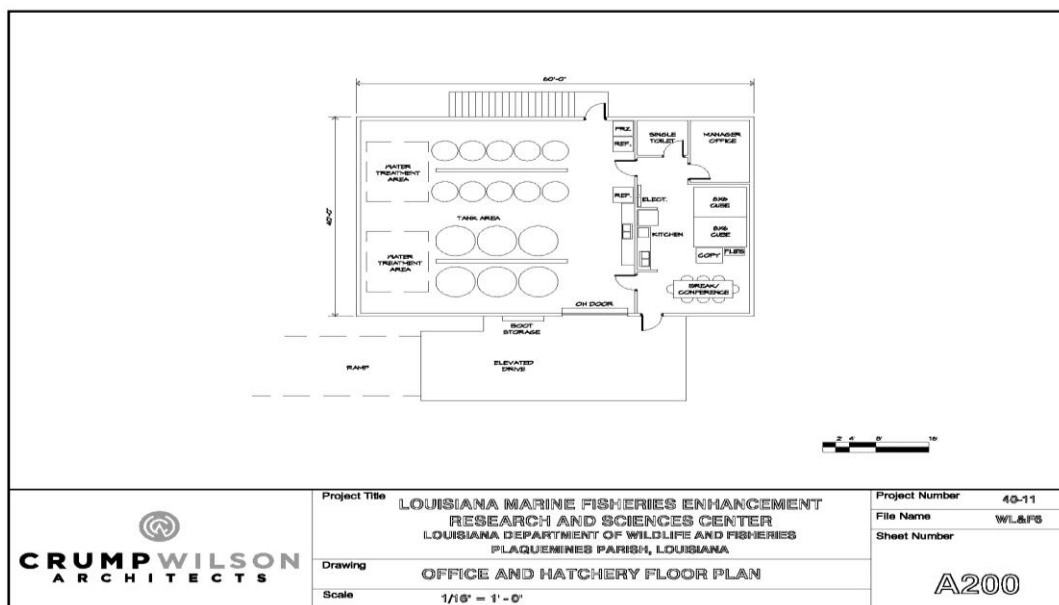


Figure 9-22. Floor plan for the Plaquemines Parish facility.

Grading and Ground Disturbance

All proposed construction would be completed in areas previously affected by construction and operation of the LSU AgCenter. The suitability of the imported earthen material observed on-site as a base for construction would be assessed during the geotechnical investigation; removal or re-grading of this material would be carried out as necessary. Work would include renovation of existing infrastructure, as well as construction of new infrastructure. The following table summarizes the work anticipated at the site (Table 9-3):

Table 9-3. Proposed construction for the Plaquemines Parish facility

EXISTING NO RENOVATION	EXISTING RENOVATION REQUIRED	NEW CONSTRUCTION
House Office	Ponds	Multi-Purpose Building
Metal Building with Awning	Freshwater Pump and Water Lines	Emergency Generator(s)
Concrete Slab	Site Utilities	Parking
Metal Building	Entrance & Access Roads	
Brick Office		

Multi-Purpose Building: The proposed building would be built on previously disturbed land within the tract described in Section 9.8.2.2. Construction of the building and parking lots would impact approximately 2 acres and would include re-grading of previously developed land.

Emergency Generator(s): In the event of a storm, the facility would have backup generator(s) with the capacity to run the administrative area and hatchery until normal utilities could be restored. The emergency generator(s) would be sized to handle the entire energy load for the site and are anticipated to be powered from natural gas, accessing a nearby natural gas main line. Automatic transfer switches would be installed at the hatchery building to automatically transfer the load to the generators in the event of power outage.

Parking: Site construction would include rehabilitation of existing roads to access the ponds. New or renovated parking would be added near the hatchery building and at the facility entrance.

Pond Renovation: Pond construction would include rehabilitation of the previous coastal plant propagation ponds and would include re-grading, compaction and installation of water supply and water control structures. Renovated ponds would be used for water storage, effluent treatment, and research on integrated multi-trophic aquaculture for freshwater and low-salinity production of baitfish and coastal plants.

Pump and Water Line Renovation: Site construction would include restoration of the existing Mississippi River water pumping system and related piping systems to support the proposed baitfish program. The existing pump system draws water from an existing intake structure in the Mississippi River and discharges into holding ponds; water is then pumped from the holding ponds to the rest of the site.

Site Utility Renovation: Construction at the facility would also require rehabilitation of existing utility systems for electrical, communications, and domestic water and wastewater treatment and connections to public utility providers.

Mobilization, Staging and Stockpiling

Temporary staging areas for material, supplies, equipment, and a contractor office trailer would be located within the proposed facility. Base aggregate, concrete, pipe, building components, and all building equipment would be delivered to the site. Construction access to the facility would be from Highway 23 (LA 23). Construction crews would include a general contractor and subcontractors for earthwork, building construction (plumbing, HVAC, electrical), and other specialty trades. Estimated

crew sizes would range from 5 to 20 persons depending on the type of work and the stage of project construction.

9.8.4 Both Facilities

9.8.4.1 Contracting

Construction would be completed based upon construction contract documents (*e.g.*, drawings, specifications, cost estimates, and contracts) reviewed and approved by the Louisiana Department of Administration and LDWF. Construction would be completed by a qualified general contractor and subcontractors using established state construction standards and requirements with comprehensive oversight by the architect/engineering design team and state construction administrators.

9.8.4.2 Construction Schedule

The estimated time for final design, any final permitting, and contractor selection needs is 18 months after procurement of funding. Construction duration (which includes construction and start-up) is then estimated to be 16 to 24 months for the Calcasieu Parish site and 14 to 18 months for the Plaquemines Parish site. Work is anticipated to be conducted between 7 am and 4 pm, Monday through Friday.

9.8.5 Operations and Maintenance

9.8.5.1 Calcasieu Parish Facility

Marine fish production would include broodstock collection and maintenance, live food production, egg incubation and larval rearing, and both pond and indoor rearing systems. Wild captured red drum, spotted seatrout and southern flounder broodfish would be collected from Louisiana waters and quarantined to monitor fish health before use in the indoor controlled spawning systems. Broodstock would be induced to spawn with temperature and photoperiod manipulation using established protocols and technology. Fertilized eggs would be collected for hatching and resultant larval fish would either be fed live foods in larval-rearing systems, or stocked in outdoor systems which provide a natural source of zooplankton for forage. Juvenile fish would be reared in a combination of tank and/or pond systems utilizing natural and artificial diets. Hatchery-produced fish would be tagged and/or marked prior to release to help inform fishery managers about the recruitment, survival, and population health of important recreational fish species and support management decisions.

Water from the source water supply systems would be micro-screened, UV disinfected, and sand filtered before use in the facility. Water salinity in the culture systems would be adjusted using artificial seawater brine systems. The facility would employ RAS technology to reduce source water volume requirements and significantly reduce operating costs associated with large volume heating and chilling of water. The indoor systems would be expected to operate using 95-to 99-% re-circulation with water treatment. This technology would include operation of self-cleaning, biosecure, and environmentally-managed circular tanks that provide controlled indoor rearing systems to spawn and rear the targeted species. These circular tank systems would provide the capability to rear advanced larger size fish (referred to as “Phase 2” or “Phase 3”) to meet precise size and timing requirements needed by LDWF research programs.

Ponds would be stocked and operated to facilitate multiple pond-rearing cycles per year. Fish production would be completed using established BMPs for marine fish production, and fish quality would be monitored and assessed using American Fisheries Society Bluebook Fish Health procedures.

Effluent water from the building and ponds requiring solids reduction would be treated in two lined, 0.5 acre settling ponds and then discharged to an unnamed tributary of the Intracoastal Waterway. Treatment would be designed to meet applicable Louisiana Pollutant Discharge Elimination System (LPDES) discharge standards.

Facility Operations

The Calcasieu Parish facility would be staffed, operated, and maintained by LDWF. Upon completion of construction, LDWF would undertake comprehensive facility commissioning, operational system testing, and staff training. Operation and maintenance manuals would be generated for all fish hatchery systems and building systems, including fish culture/spawning systems; process water treatment systems; source water supply systems; HVAC, electrical, and alarm/instrumentation systems; and emergency procedures. Operation of the facility would be enhanced by the use of computer-based instrumentation that provides computerized control of the industrial systems, on-going data acquisition, and an alarm system that would provide 24-hour/7-day per week monitoring and electronic notification of operational problems. In order to avoid fish loss, the building, emergency power systems (including emergency generators), and related hurricane-tolerant infrastructure would allow for continuous operation of the fish life-support components during adverse weather events.

LDWF would prepare an operating plan for both sites. The plan would outline the target annual production goals (including broodstock requirements) by species (*e.g.*, numbers and sizes), identify the required indoor fish culture and outdoor pond facilities and water quantities needed, and would include an annual operating budget. The LDWF operating plan would incorporate BMPs for marine fish rearing and hatchery operation, including a disease and health management plan, which addresses the protocols for wild broodfish management in addition to standard fish culture practices. A genetic resource management plan would also be developed to avoid deleterious effects to the genetic integrity of wild populations.

Sport fish produced at the Center would be marked and released to assist with the long-term monitoring of Louisiana's fishery resources and the habitats that support them. The production, release, and monitoring of marked hatchery fish would be carried out in conjunction with LDWF's statewide fishery monitoring program. Thus, the Center's performance would be evaluated in part based on its ability to help develop and evaluate strategies for the management of marine fish species by providing information on the recruitment, survival, health, and movements of these populations. Maintenance of the facility equipment and grounds would be performed by LDWF staff and through maintenance contracts with major equipment manufacturers or professional service contractors.

Plaquemines Parish Facility

The Plaquemines Parish facility would pump freshwater from the Mississippi River to holding ponds, from which water would be supplied for building and pond operations. Flow would be variable, up to 1,000 gpm, and dependent upon seasonal production needs.

The facility operation would include the use of indoor, small-scale, bio-secure and environmentally controlled culture systems, using RAS technology. Desired salinity levels in RAS would be achieved using synthetic sea salt mixtures. The RAS would be used to support research and demonstration of techniques to produce Gulf killifish and Atlantic croaker, which are important marine baitfish for recreational sport fishing. The rehabilitation of existing ponds would be used for a combination of effluent treatment and research projects on integrated multi-trophic aquaculture for freshwater and low-salinity production of baitfish and coastal plants.

Facility Operations

The Plaquemines Parish facility would be staffed, operated, and maintained by LDWF. Upon completion of construction, LDWF would conduct comprehensive facility commissioning, operational system testing, and staff training. These operations would cover all water supply source and drainage systems; indoor tank and recirculation systems; and HVAC, electrical and alarm/instrumentation systems.

Commissioning and staff training would also include how to operate the rehabilitated research ponds and other facility pond infrastructure including the existing Mississippi River water pumping system. Maintenance of the facility equipment and grounds would be completed by the LDWF staff or by service contractors. In order to avoid fish loss, the elevated building, emergency power systems (including emergency generator), and related hurricane-tolerant infrastructure would allow for continuous operation of the baitfish life-support components during adverse weather events.

The baitfish research and demonstration program for Gulf killifish and Atlantic croaker would follow an annual research plan and operating budget developed by LDWF to specifically address the seasonal variability of live marine baitfish. Currently all marine baitfish in Louisiana are wild caught, thus cultured baitfish could potentially supplement the wild supply to provide year round availability for recreational fishermen. The demonstration component of the facility would be to teach BMPs for handling and holding live marine baitfish, to improve the quality of the product whether wild caught or cultured. The research component of the facility would tackle the fundamental scientific information needs for successful live marine baitfish holding and production, including husbandry and maturation, controlled spawning, larviculture, nutrition, grow-out, fish health, economics, and marketing. The baitfish research and demonstration programs would target gaps in the science of marine baitfish production to further the propagation of important and valuable marine baitfish species. The operation of the facility would include demonstration of baitfish aquaculture technology to the Louisiana marine baitfish industry, recreational sport fishermen, and academia as a part of information dissemination through education, extension, and outreach.

9.8.6 Affected Environment and Environmental Consequences

9.8.6.1 No Action

Both OPA and NEPA require consideration of the No Action alternative. For this Draft Phase III ERP proposed project location, the No Action alternative assumes that the Trustees would not pursue the Louisiana Marine Fisheries Enhancement, Research, and Science Center as part of Phase III Early Restoration.

Under the No Action alternative, the existing conditions described for the project location in the affected resources subsections would prevail. Restoration benefits associated with this project location would not be achieved at this time.

9.8.6.2 Physical Environment

Geology and Substrates

Calcasieu Parish Facility

Affected Resources

Soils at the Calcasieu Parish facility include (AN) - Aquents, frequently flooded, (CO) - Clovelly muck, (Cr)- Crowley-Vidrine silt loams, and (GB) Ged clay. A geotechnical investigation, which would occur during the design phase, would determine the characteristics and stability of subsurface soil conditions within the footprint of the proposed facilities and ponds. This investigation could influence the design and placement of project features and reveal construction limitations.

The Calcasieu Parish site is characteristic of coastal prairie habitat and includes mima mounds, wetlands, and forested areas adjacent to an unnamed tributary. Mima mounds are natural formations that occur in some coastal prairies within the Gulf Coast Region. These land features are low, flattened, circular to oval in shape, dome-like mounds composed of loose, sandy loam or loamy sand soils. Mima mounds range in diameter from 18-feet to more than 135-feet and between 1-foot to more than 4-feet in height. The low areas between mima mounds often contain shallow, emergent, freshwater wetlands due to the restricted run off over higher clay content surface soils.

Environmental Consequences

Construction of the approximately 12-acre facility would result in long-term adverse impacts to the affected soils and soil substrate in areas where the footprint of the facility (*e.g.*, the building, roads, and ponds) would alter the soil substrate through fill, compaction and earth moving activities. Construction could also result in short-term soil erosion. To minimize impact, disturbed soils would be re-vegetated and/or landscaped thereby resulting in no long-term adverse effects from erosion. The proposed project would result in short-term minor adverse impacts to soil resources surrounding the facility.

Specific measures would be implemented during construction to minimize impacts to soils including best management practices (BMPs) such as the implementation of an erosion control and storm water management plan, installation of sediment traps prior to commencement of construction activities, post-construction revegetation, and on-going construction monitoring to ensure compliance.

Plaquemines Parish Facility

Affected Resources

Soils at the Plaquemines Parish facility include (CV)-Carville, Cancienne, and Schriever, frequently flooded, (Cm)-Cancienne silt loam, (Co)-Cancienne silty clay loam, (Ha)-Harahan clay, and (Sk)-Schriever clay. As described previously, earthen material is being processed and spread at the site.

This project facility is proximal to the Mississippi River and the Mississippi River and Tributaries levee. The U.S. Army Corps of Engineers, New Orleans District regulates activities within 1,500 ft of the levee. A geotechnical investigation, which would occur during the final design phase, would evaluate project features and determine if there are any unusual subsurface conditions.

Environmental Consequences

New construction of a building (approximately 2400 ft²), access roads, and parking at the Plaquemines Parish facility would result in short-term adverse impacts to soils (< 10 acres). The impact footprint would be small because the majority of the facility was previously developed. Subsequent to construction, affected soils at the periphery of the facility would be revegetated and/or landscaped; thereby reducing erosion effects. The proposed project would result in short-term minor adverse impacts to soil resources surrounding the facility.

Specific measures would be implemented during construction to minimize impacts to soils including best management practices (BMPs) such as the implementation of an erosion control and storm water management plan, installation of sediment traps prior to commencement of construction activities, post-construction revegetation, and on-going construction monitoring to ensure compliance. The proposed excavation of existing ponds and pump modifications would also be subjected to an Engineering Review for minor Section 408 requirements at the USACE District level, including evaluation of the geotechnical analysis.

9.8.6.3 Hydrology and Water Quality

Calcasieu Parish Facility

Affected Resources

Hydrology

The proposed Calcasieu Parish facility located on Map Number 22019C0635F (effective February 18, 2011) is within FEMA Zones A/AE, the 100-year flood zone. The land that contains the facility is characteristic of coastal prairie habitats within the Gulf Coast region.

A 2013 field delineation of the study area (87.67 acres within a 320.5 acre land tract) identified a total of approximately 6.96 acres of wetlands. The non-tidal areas north of Joe Ledoux Road had a lower percentage of depressional wetlands than the southern side due in part to drainage towards the lower tidal areas. Two ponds, totaling 0.24 acres, were identified on the north and south sides of Joe Ledoux Road (Figure 9-23),

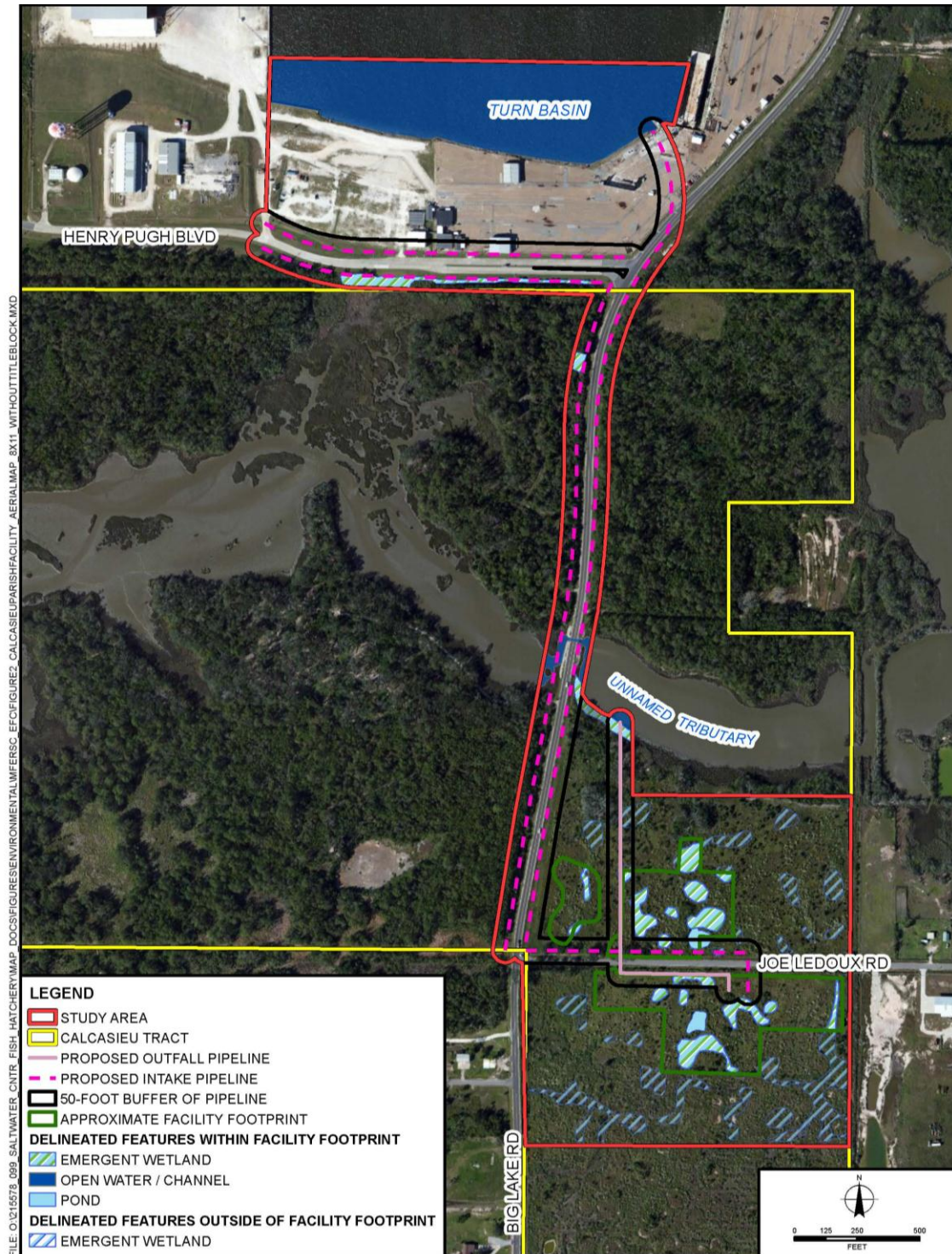


Figure 9-23. Calcasieu Parish facility preliminary wetland delineation based on 2013 field survey.

Two open waters (channels) totaling 12.1 acres were also identified during field investigations. The first open water/channel is an unnamed tributary of the Calcasieu River, located within the study area, which is a tidally influenced waterway and a receiving body of storm water runoff. Although the channel appears to be a natural land feature, it has been altered from its natural geomorphological character

due to the Big Lake Road crossing and the construction of the Turn Basin, in addition to other land use disturbances upstream of the study area. Water flow within the channel was apparent, but slow. Little shoreline erosion was observed during field investigations. A desktop review of aerial imagery concluded that mud flats appear along the edges of the channel when the water level is low and during dry seasons (Figure 9-23).

The second open water/channel that lies within the study area was identified as the Turn Basin which connects to the Calcasieu River. It is located north of Henry Pugh Road and within the LNG Shipping Yard. Field investigations revealed that the shoreline of the channel is lined with concrete matting and riprap and consists of few areas of natural vegetation. Little shoreline erosion of the Turn Basin shoreline within the study area was observed (Figure 9-23).

The field delineation also identified several excavated drainage ditches in the study area. The ditches occur along Henry Pugh Boulevard, Big Lake Road, and Joe Ledoux Road. These ditches appear to have been excavated in uplands for the purposes of stormwater flow away from transportation infrastructure. These drainage ditches appear to convey water directly to the unnamed tributary. The ditch running parallel to the south side of Henry Pugh Boulevard appears to hold some water based on the field investigation (Figure 9-23).

Water Quality

Segments within 5 miles of the proposed project were assessed for the Final 2012 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)) (Segments LA 030301_00, LA 030303_00, LA 030304_00, LA 030305_00, LA 030401_00, LA 030402_00, LA 030403_00, LA 030901_00, LA 031001_00, LA 031002_00, LA_031101_00). According to the 2012 303(d) list of impaired waters, as reported by the Louisiana Department of Environmental Quality, one of these Segments found within 5 miles of Calcasieu Parish facility was listed as impaired: the Gulf Intracoastal Waterway.

The Gulf Intracoastal Waterway, from Calcasieu Lock to East Calcasieu River (Segment LA 031101_00), is listed as impaired due to the presence of higher than allowable levels of chloride, sulfates, total dissolved solids, and water temperature. The suspected sources for the chloride, sulfates, and total dissolved solids included changes in tidal circulation and flushing and impacts from hydrostructure flow regulation and modification. The suspected source for water temperature included natural sources and drought-related impacts. This impaired water was located approximately 0.3 mile southwest and downgrade of the Calcasieu Parish facility (Table 9-4). Prien Lake (Segment LA 030303_00) and the Calcasieu River, from below Moss Lake to the Gulf of Mexico (Segment LA 030401_00) were both listed as impaired in the 2008 303(d) list of impaired water bodies due to higher than allowable levels of fecal coliform and low dissolved oxygen concentrations. According to the 2012 303(d) list, these Segments are no longer considered impaired.

Table 9-4. 303(d) impaired waters within 5-miles of the facility.

STREAM SEGMENT NUMBER	STREAM SEGMENT DESCRIPTION	SUSPECTED CAUSES OF IMPAIRMENT	SUSPECTED SOURCES OF IMPAIRMENT	RELATION TO SITE
Calcasieu Parish Facility				
LA031101_00	Intracoastal Waterway-From Calcasieu Lock to East Calcasieu River Basin boundary	Chloride	Changes in Tidal Circulation/Flushing; Impacts from Hydrostructure Flow	Located downgrade southwest 0.3 mile
LA031101_00	Intracoastal Waterway-From Calcasieu Lock to East Calcasieu River Basin boundary	Sulfates	Changes in Tidal Circulation/Flushing; Impacts from Hydrostructure Flow	Located downgrade southwest 0.3 mile
LA031101_00	Intracoastal Waterway-From Calcasieu Lock to East Calcasieu River Basin boundary	Total Dissolved Solids	Changes in Tidal Circulation/Flushing; Impacts from Hydrostructure Flow	Located downgrade southwest 0.3 mile
LA031101_00	Intracoastal Waterway-From Calcasieu Lock to East Calcasieu River Basin boundary	Temperature, water	Drought-related Impacts; Natural Sources	Located downgrade southwest 0.3 mile

Source: LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY 2012 303d List Of Impacted Waters.

Environmental Consequences

Construction of the facility would result in minor modifications to hydrology at the Calcasieu Parish facility site. The introduction of impermeable surfaces (parking lot, roads, sidewalks) would create higher rates of runoff during storm events, resulting in faster hydrographic peaking and potential for erosion and sedimentation of ancillary waterways. The degree to which impacts would occur would be reduced through the implementation of mitigation measures such as revegetation around the facility or other appropriate and cost-effective on-site treatment options. Despite the incorporation of these measures, however, natural hydrologic flows would be altered to some degree by the construction of the facility. These adverse impacts would be long-term but are expected to be relatively minor, given the small footprint of the facility compared to the overall size of the land tract. Approval from local floodplain administrators and FEMA would be sought for potential impacts to the 100-year floodplain that might modify the characteristics of floodwaters. During final design, standard engineering review would include an analysis of both the volume and velocity of runoff from the site to ensure that offsite effects would be reduced.

There are currently no ground water restrictions in place for Calcasieu Parish. However, prior notification to the Louisiana Department of Natural Resources (LDNR) Groundwater Resources Program would be provided before construction of process waterwells for the proposed developments. Review by the LDNR would ensure that no adverse effects to groundwater would occur. Pond lining would

prevent seepage of pond water into groundwater. Therefore, no adverse impacts to groundwater would be expected from pond construction.

Construction would result in short-term, adverse impacts to stormwater due to increased sedimentation from disturbance of ground cover, extensive excavation, and grading of the facility. A comprehensive Stormwater Pollution Prevention Plan with Best Management Practices to protect water quality (e.g., silt fence, re-vegetation) would likely mitigate these impacts (see section 9.8.6.2 for additional discussion on erosion effects). Additionally, these measures would also likely fulfill the requirements of the Section 401 Certification.

Operation of the facility could result in long-term, minor impacts to the Turn Basin from construction and operation of the water intake system. Operation of the facility would result in long-term, minor impacts to an unnamed tributary of the Intracoastal Waterway from the discharge of effluent water for location of tributary). It is expected that this impact would be minor because the treatment of effluent in lined, 0.5 acre settling ponds would be designed to meet applicable LPDES discharge standards. There are no LPDES general permits that authorize operational discharges from hatcheries. According to Louisiana Environmental Regulatory Code, Title 33, Part IX, Subpart 1, Section 2507, a fish hatchery may be designated on a case-by-case basis as a concentrated aquatic animal production facility by the state administrative authority if it is determined to be a “significant contributor of pollution to waters of the state.” No permit is required until the state administrative agency has made its determination based on a facility inspection (Title 33 §2507 (C)(2)). Coordination with the state administrative authority would be initiated to assist in a determination of LPDES applicability. If required during the final permitting process, additional evaluations including a review of the water balance of the Turn Basin and surrounding systems would be performed to assess any potential impacts to surrounding waters and determine if modifications to the design of the proposed intake or effluent systems are needed.

Based on the preliminary conceptual designs currently available, construction on this facility site will likely require a permit for Section 404 of the Clean Water Act to authorize impacts to waters of the U.S., including wetlands. Construction of the facility within the currently proposed facility footprint may result in adverse impacts to approximately 2.85 acres of emergent wetlands, 0.48 acres of open water/channels, and 0.24 acres of ponds. As design progresses, impacts to wetlands and other waters will be minimized by modifying the site plan to the extent practicable. The compensatory mitigation requirements of Section 404 permitting would provide for the replacement of the functions of wetlands and waters impacted by the proposed project.

Plaquemines Parish Facility

Affected Resources

Hydrology

Despite the facility's proximity to the Mississippi River, no natural hydrologic connections between the River and the site were apparent, due to the constructed levee system. The Plaquemines Parish facility located on Map Number 2201390430B (effective May 1, 1985) is entirely within FEMA Zone A, the 100-year flood zone.

During field investigations held in September of 2013, existing open water/ponds and wetland areas were observed within the Plaquemines Parish facility study area (approximately 40.34 acres of the land tract were studied). The open water/pond and wetland features observed are remnants of previously constructed ponds and wetlands which were used for research purposes at the LSU AgCenter that once operated on the property. No natural wetlands or aquatic features occur on the property. The wetlands present are characterized as freshwater emergent and have resulted from the cessation of constant artificial pumping of water inflows to the constructed ponds. Approximately 5.6 acres of emergent wetlands and approximately 2.3 acres of ponds were delineated within the study area (Figure 9-24) based on the field investigations.

According to the LDNR online database (Strategic Online Natural Resource Information System [SONRIS] 2011), three Coastal Use Permits (CUPs) were previously acquired for work conducted partially or completely within the Plaquemines Parish facility. In February 2007, the LSU AgCenter received a permit (CUP NUM:P20070171) to create wetland propagation ponds on the project site. In June 2008, LSU AgCenter received a permit (CUP NUM:P20080659) to improve existing buildings and build new structures. In April 2009, CLL Partnership, LTD received a permit (CUP NUM:P20090080) across Hwy 23 from the LSU AgCenter to excavate a borrow pit for fill material.

Water Quality

Segments within 5-miles of the proposed project were assessed for the Final 2012 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)) (LA 020904_00, LA 020907_00, LA 042102_00, LA 042104_00, LA 070301_00). According to the 2012 303(d) List of impaired waters as reported by the Louisiana Department of Environmental Quality, there were no impaired water bodies within 1-mile of the Plaquemines Parish facility. Two impaired water bodies were located approximately 4.3 and 4.8 miles north and upriver from the Plaquemines Parish facility. An estuarine segment (Segment LA 042102_00) of the River Aux Chenes, also called the Oak River, and Petit Lake (Segment LA 042104_00) was listed as impaired due to the presence of higher than allowable levels of fecal coliform. Suspected sources of impairment are listed below in Table 9-5.



Figure 9-24. Plaquemines Parish facility preliminary wetland delineation based on 2013 field survey.

Table 9-5. 303(d) impaired waters within 5 miles of the facility.

STREAM SEGMENT NUMBER	STREAM SEGMENT DESCRIPTION	SUSPECTED CAUSES OF IMPAIRMENT	SUSPECTED SOURCES OF IMPAIRMENT	RELATION TO SITE
Plaquemines Parish Facility				
LA042102_00	River Aux Chenes; also called Oak River (Estuarine)	Fecal Coliform	Wildlife Other than Waterfowl	Located upgrade north 4.3 miles
LA42104_00	Petit Lake	Fecal Coliform	Marina/Boating Sanitary On-vessel Discharges	Located upgrade north 4.8 miles
LA42104_00	Petit Lake	Fecal Coliform	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Located upgrade north 4.8 miles
LA42104_00	Petit Lake	Fecal Coliform	Wildlife Other than Waterfowl	Located upgrade north 4.8 miles

Source: Louisiana Department of Environmental Quality 2012 303d list of Impacted Waters.

Environmental Consequences

Construction of the facility would result in minor modifications to hydrology at the site. The small footprint of new construction would increase the area of impermeable surface and would create higher rates of runoff during storm events resulting in faster hydrographic peaking and potential for erosion and sedimentation of ancillary waterways. The degree to which impacts would occur could be reduced through the implementation of mitigation measures such as re-vegetation around the facility. Despite the incorporation of these measures, however, natural hydrologic flows would be altered to some degree by the construction of the facility. During final design, standard engineering review would include an analysis of both the volume and velocity of runoff from the site to ensure that offsite effects would be reduced. These adverse impacts would be long-term but would be expected to be very minor, given the small footprint of new construction on an already developed site.

There are currently no groundwater restrictions in place for Plaquemines Parish. Pond lining would prevent seepage of pond water into groundwater. No adverse impacts to groundwater would be expected.

Construction would result in short-term, adverse impacts to stormwater due to increased sedimentation from disturbance of ground cover, excavation, and grading of the facility. A comprehensive Stormwater Pollution Prevention Plan with Best Management Practices to protect water quality (*e.g.*, silt fences, re-vegetation) and reduce potentially adverse effects to water quality. These measures would also likely fulfill the requirements of the Section 401 Water Quality Certification and mitigate these impacts.

Based on conceptual plans, the operation of the facility would result in long-term, minor impacts to an inland marsh of the Barataria Estuary from the discharge of effluent water. This impact would be expected to be minor because the treatment of effluent in 0.5 acre settling ponds would be designed to

meet applicable LPDES discharge standards. The water leaving the effluent ponds would enter an existing drainage ditch system that crosses LA 23 and discharges into an inland marsh of the Barataria Estuary. As described above, there are no LPDES general permits that authorize operational discharges from hatcheries. According to Louisiana Environmental Regulatory Code, Title 33, Part IX. Subpart 1, Section 2507, a fish hatchery may be designated on a case-by-case basis as a concentrated aquatic animal production facility by the state administrative authority if it is determined to be a “significant contributor of pollution to waters of the state.” No permit is required until the state administrative agency has made its determination based on a facility inspection (Title 33 §2507 (C)(2)). Coordination with the state administrative authority would be initiated to assist in a determination of LPDES applicability.

Approximately 3.2 acres of emergent freshwater wetlands and 2.3 acres of open water/ponds resulting from previous agricultural activities were delineated within the facility foot print (six renovated ponds outlined in green) during field investigations held in September of 2013 (Figure 9-24). The Plaquemines Parish facility is proposed to be located within a “fastland¹” area with no anticipated impacts to natural wetlands and aquatic features.

9.8.6.4 Air Quality and Greenhouse Gas Emissions

Both Facilities

Affected Resources

The Clean Air Act of 1970 and EPA regulatory programs govern air pollution assessment and control. In Louisiana, the EPA and Louisiana Department of Environmental Quality are responsible for air quality protection. Under authority of the Clean Air Act, the EPA established primary and secondary pollutant criteria called the National Ambient Air Quality Standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. EPA has established standards for the following six principal pollutants, which are called "criteria" pollutants: particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m³).

A regulatory driver for air emissions and air quality analysis is the federal General Conformity program, the rules for which are set forth in 40 C.F.R. § 93, Subpart B. The purpose of the General Conformity program under the Clean Air Act is to prevent, or force mitigation of, any federal actions that would impair a state’s approved plan to achieve attainment with the National Ambient Air Quality Standards. If there is a federal agency action to approve/permit or to provide funds for the Proposed Action, General Conformity rules may apply. The General Conformity program applies only to projects located in an area that is designated as “non-attainment” (geographic areas that do not adhere to national ambient air requirements) or “maintenance” (former non-attainment area) with respect to one or more of the National Ambient Air Quality Standards.

The Louisiana Department of Environmental Quality is federally authorized to administer the federal Part 70 (Title V) and New Source Review programs. The EPA has delegated to Louisiana Department of Environmental Quality the authority to implement and enforce certain New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants (NESHAPs) promulgated by EPA under 40 C.F.R. §§ 60, 61, and 63. Besides exemptions that do not require Louisiana Department of Environmental Quality approval, any source that emits, or has the potential to emit, any air contaminant (defined as “particulate matter, dust, fumes, gas, mist, smoke, or vapor, or any combination thereof, visible or not, produced by processes other than natural”) requires written approval from Louisiana Department of Environmental Quality. If the Proposed Action has the potential to emit air contaminants, it should be further evaluated for the applicability of exemptions and/or air permitting requirements. For instance, construction activities for the Proposed Action should meet ambient air quality, visibility, odor, and opacity standards and implement reasonable particulate matter control.

The proposed facilities are located in Plaquemines and Calcasieu Parishes. These parishes are not listed as a non-attainment or maintenance areas for the National Ambient Air Quality Standards. Thus, the proposed project is not likely to be subject to General Conformity requirements.

Greenhouse gases are chemical compounds found in the Earth’s atmosphere that absorb and trap infrared radiation as heat. Human activities such as deforestation, soil disturbance, and burning of fossil fuels disrupt the natural cycle by increasing the greenhouse gas emission (release) rate over the removal (storage) rate, which results in a net increase of greenhouse gases in the atmosphere. The principal greenhouse gases emitted into the atmosphere through human activities are CO₂, methane, nitrous oxide, and fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (EPA 2010b). CO₂ is the major greenhouse gas emitted, and the burning of fossil fuels accounts for 81 percent of all U.S. greenhouse gas emissions (EPA 2010b; Houghton 2010; U.S. Energy Information Administration 2009b).

Environmental Consequences

Temporary adverse impacts to air quality would be minor for the proposed project. Air emissions from standard construction equipment and vehicular traffic would be expected, but would be anticipated to be within reasonable allowable limits. Potential impacts would be temporary and limited to construction. Reasonable particulate matter control measures would be implemented. Air quality issues would be minor during facility operations. This would include automobile emissions associated with employees and visitors traveling to and from the site. Additional emissions would be produced by electricity generated offsite needed to support the facility.

Construction of the facilities would require use of equipment that would contribute to air quality emissions and GHGs such as CO₂. Due to the small area, the exhaust emissions are expected to be minor, with bulldozer, backhoe, and grader being the most likely equipment used to prepare the site to be developed. Any air quality degradation would be very limited to the area immediately around the construction site and would only last during the site preparation period— estimated to be 16 to 24 months for the Calcasieu Parish site and 14 to 18 months for the Plaquemines Parish site. Table 9-6 describes the estimated GHG emission scenario for the implementation of both facilities. Because detailed construction plans have not

yet been developed, this scenario (total hours for different types of equipment) is a preliminary estimate. The calculation of greenhouse gas impacts provides an indication of the relative magnitude of emissions from the construction activities and should not be considered a precise estimate.

Table 9-6. Greenhouse gas impacts of the proposed project for major construction equipment.

EQUIPMENT DESCRIPTION	EQUIPMENT SIZE (HP) ¹	LOAD FRACTION ²	TOTAL HOURS USED	Power Consumed (hp-hr)	CO ₂ FACTOR-kg/hp-hr ^{3,4}	CO ₂ (MT)	CH ₄ FACTOR-kg/hp-hr ^{3,4,5}	CH ₄ (MT)	N ₂ O FACTOR-kg/hp-hr ^{3,4,5}	N ₂ O (MT)	TOTAL CO ₂ e (MT)
Preliminary Greenhouse Gas (GHG) Emissions during Construction of the Calcasieu Parish Facility											
Diesel Dumpers/Tenders	10.00	0.21	1,583	3,324.3	0.51772	1.72	0.00044	0.00	0.00130	0.00	1.7
Diesel Cement & Mortar Mixers	5.98	0.43	186	478.5	0.51772	0.25	0.00044	0.00	0.00130	0.00	0.2
Diesel Grader	231.20	0.59	689	93,985.1	0.51772	48.66	0.00044	0.04	0.00130	0.12	48.8
Diesel Backhoe	87.17	0.21	405	7,413.8	0.51772	3.84	0.00044	0.00	0.00130	0.01	3.9
Diesel rubber tire dozer	136.30	0.59	262	21,069.3	0.51772	10.91	0.00044	0.01	0.00130	0.03	10.9
Diesel loader	87.17	0.21	1,583	28,977.9	0.51772	15.00	0.00044	0.01	0.00130	0.04	15.1
Diesel Cranes	237.70	0.43	1,200	122,653.2	0.51772	63.50	0.00044	0.05	0.00130	0.16	63.7
Diesel Trenchers	61.02	0.59	27	972.0	0.51772	0.50	0.00044	0.00	0.00130	0.00	0.5
Diesel Excavator	137.60	0.59	1,741	141,341.3	0.51772	73.18	0.00044	0.06	0.00130	0.18	73.4
Diesel Asphalt Paver	134.60	0.59	91	7,226.7	0.51772	3.74	0.00044	0.00	0.00130	0.01	3.8
Diesel Tandem Roller	84.76	0.59	148	7,401.2	0.51772	3.83	0.00044	0.00	0.00130	0.01	3.8
Diesel Vibratory Roller	84.76	0.59	190	9,501.6	0.51772	4.92	0.00044	0.00	0.00130	0.01	4.9
Diesel Water Truck	419.90	0.59	600	148,644.6	0.51772	76.96	0.00044	0.07	0.00130	0.19	77.2
Diesel Pick Up Truck	56,000 gallons of fuel used	16,800	10.2068 (kg/gallon)	571.56	0.008694 (kg/gallon)	0.49	0.025668 (kg/gallon)	1.44	573.5		
Total				878.6		0.7		2.2	881.5		
Preliminary Greenhouse Gas (GHG) Emissions during Construction of the Plaquemines Parish Facility											
Diesel Dumpers/Tenders	10.00	0.21	558	1,171.8	0.51772	0.61	0.00044	0.00	0.00130	0.00	0.6
Diesel Cement & Mortar Mixers	5.98	0.43	62	159.5	0.51772	0.08	0.00044	0.00	0.00130	0.00	0.1
Diesel Grader	231.20	0.59	18	2,455.3	0.51772	1.27	0.00044	0.00	0.00130	0.00	1.3
Diesel Backhoe	87.17	0.21	117	2,141.8	0.51772	1.11	0.00044	0.00	0.00130	0.00	1.1
Diesel rubber tire dozer	136.30	0.59	91	7,317.9	0.51772	3.79	0.00044	0.00	0.00130	0.01	3.8
Diesel Loader	87.17	0.21	558	10,214.6	0.51772	5.29	0.00044	0.00	0.00130	0.01	5.3

EQUIPMENT DESCRIPTION	EQUIPMENT SIZE (HP) ¹	LOAD FRACTION ²	TOTAL HOURS USED	Power Consumed (hp-hr)	CO ₂ FACTOR-kg/hp-hr ^{3,4}	CO ₂ (MT)	CH ₄ FACTOR-kg/hp-hr ^{3,4,5}	CH ₄ (MT)	N ₂ O FACTOR-kg/hp-hr ^{3,4,5}	N ₂ O (MT)	TOTAL CO ₂ e (MT)
Diesel Cranes	237.70	0.43	600	61,326.6	0.51772	31.75	0.00044	0.03	0.00130	0.08	31.9
Diesel Trenchers	61.02	0.59	8	288.0	0.51772	0.15	0.00044	0.00	0.00130	0.00	0.1
Diesel Excavator	137.60	0.59	17	1,380.1	0.51772	0.71	0.00044	0.00	0.00130	0.00	0.7
Diesel Asphalt Paver	134.60	0.59	16	1,270.6	0.51772	0.66	0.00044	0.00	0.00130	0.00	0.7
Diesel Tandem Roller	84.76	0.59	34	1,700.3	0.51772	0.88	0.00044	0.00	0.00130	0.00	0.9
Diesel Vibratory Roller	84.76	0.59	67	3,350.6	0.51772	1.73	0.00044	0.00	0.00130	0.00	1.7
Diesel Water Truck	419.90	0.59	600	148,644.6	0.51772	76.96	0.00044	0.07	0.00130	0.19	77.2
Diesel Pick Up Truck	5667 gallons of fuel used	1,700	10.2068 (kg/gallon)	57.84	0.008694 (kg/gallon)	0.05	0.025668 (kg/gallon)	0.15	58.0		
Total						182.8		0.2		0.5	183.4

HP = horse power
kg/hp-hr=kilograms per horse power per hour
CO₂= carbon dioxide
mt = metric tons
CH₄ = methane
N₂O = nitrogen dioxide
CO₂e= CO₂ equivalent

1 U.S. Environmental Protection Agency. Assessment and Standards Division, Office of Transportation and Air Quality. Nonroad Engine Population Estimates. EPA-420-R-10-017. NR-006e. July 2010, pages A12-A25.

<http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10017.pdf>

2 U.S. Environmental Protection Agency. Assessment and Standards Division, Office of Transportation and Air Quality. Nonroad Engine Population Estimates. EPA-420-R-10-017. NR-006e. July 2010, pages A12-A25.

<http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10017.pdf>

3 For CO₂: U.S. Government Printing Office. Electronic Code of Federal Regulations. 40 C.F.R. 98. Table C-1 to Subpart C of Part 98: Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel.

For CH₄ and N₂O: U.S. Government Printing Office. Electronic Code of Federal Regulations. 40 C.F.R. 98. Table C-2 to Subpart C of Part 98: Default CH₄ and N₂O Emission Factors and High Heat Values for Various Types of Fuel."

4 EPA Publication AP-42, Compilation of Air Pollutant Emission Factors, Volume 1, Stationary Point and Area Sources, Table 3.3-1, page 3.3-6.

5 U.S. Government Printing Office. Electronic Code of Federal Regulations. 40 C.F.R. 98. Table A-1 to Subpart A of Part 98—Global Warming Potentials.

Based on the assumptions detailed in Table 9-6, the project would generate approximately 1,065 metric tons of GHGs during project construction. The following mitigation measures have been identified to reduce emissions from the project:

- Shut down idling construction equipment, if feasible.
- Locate staging areas as close to construction sites as practicable to minimize driving distances between staging areas and construction sites.
- Encourage the use of the proper size of equipment for the job to maximize energy efficiency.
- Encourage the use of alternative fuels for generators at construction sites, such as propane or solar, or use electrical power where practicable.

Operation of the two facility sites would increase energy consumption above pre-construction levels. The use of RAS would minimize emissions associated with water heating and cooling compared to facilities that use flow-through systems. Based on the above, and with the incorporation of mitigation measures, the Center would have long-term minor impacts on greenhouse gas emissions.

9.8.6.5 Noise

According to the EPA, noise is defined as “unwanted or disturbing sound.” Sound becomes unwanted when it either interferes with normal activities, such as sleeping or conversation, or disrupts or diminishes one’s quality of life. Ambient noise is defined as existing background noise generated from multiple sources in a surrounding environment, such as noise from construction sites, air traffic, automobiles, and industrial operations.

The Noise Control Act of 1972 establishes a national policy to help ensure that all Americans are protected from noise at a level that may jeopardize their health and welfare. The Act also serves to (1) establish a means for effective coordination of federal research and activities in noise control; (2) authorize the establishment of federal noise emission standards for products distributed in commerce; and (3) provide information to the public regarding the noise emission and noise reduction characteristics of these products.

Units of noise are measured and reported in dBA, a typical weighted measurement of sound. Institutional recognition of noise is provided by the Occupational Noise Exposure (29 C.F.R. Part 1910.95) under the Occupational Safety and Health Act of 1970. This section mandates that noise levels emitted from construction equipment be below 90 dBA for exposures of 8 hours per day or more. The upper limit for unprotected hearing exposure established by the Occupational Safety and Health Administration (OSHA) is 115 dBA.

Calcasieu Parish Facility

Affected Resources

Ambient noise levels at the Calcasieu Parish facility are moderate, resulting from sources such as roadway traffic, industrial facilities operations, barge traffic near the port, recreational boating noise, and air traffic from the nearby airport (located approximately three miles from the project site). Local

residents will experience direct, yet temporary noise impacts from construction, typical of construction equipment and human labor activities.

Environmental Consequences

A minor, temporary increase in noise (*e.g.*, similar to that of noise stemming from nearby port and oil and gas activities) could be expected in association with construction equipment, machinery, and human labor activities at the proposed project facility. Construction would be limited to daylight working hours in order to reduce the noise impacts to the surrounding environment. Noise from construction activities dissipates as it emanates further from its source. While the nearest residential area lies within 500 feet of the proposed facility, these adjacent homes are located behind the project site off of Joe Ledoux Road and are likely not to be directly impacted from operational traffic associated with facility maintenance vehicles, supply trucks, or visitors, utilizing Big Lake Road as the main entrance to the site. Residences adjacent to the facility (a minimum of approximately 500 feet from the site) will experience the more direct impact, with more populated residential areas further north being able to perceive less of the noise. Noise levels during construction and facility operations will not exceed acceptable limits of OSHA regulations, will be temporary and localized in nature, and will not adversely impact or add stress to the environment or its human and biological inhabitants. Construction access is anticipated to be from Joe Ledoux Road. Ambient noise directly surrounding the site would not likely exceed noise levels pre-construction because of the large undisturbed area and natural forest type vegetation around the facility footprint providing a buffer for residential areas to the north.

Plaquemines Parish Facility

Affected Resources

The Plaquemines Parish site lies in a semi-rural setting along LA 23, with the nearest residential area located approximately 500-feet of the facility. Across LA 23, the predominant land use type is agriculture. The residential areas within one mile of the facility lie mostly on the east side of LA 23, with populations increasing to the south of the project site. Varying degrees of ambient noise levels are experienced daily by residents from current highway construction, highway traffic along LA 23, barge traffic on the Mississippi River, industrial plant operations, agricultural operations, and recreational and commercial fishing boats in nearby waterways and marinas. Noise from vehicular traffic along LA 23 and agricultural and industrial plant operations are usually between 50 and 60 dBA at 100 feet.

Environmental Consequences

A minor, temporary increase in noise (*e.g.*, similar to noise associated with current road construction on LA 23) can be expected in association with construction equipment, machinery, and human labor activities at the proposed project facility. Construction would be limited to daylight working hours in order to reduce the noise impacts to the surrounding environment. Noise from construction activities dissipates as it emanates further from its source. Residences adjacent to the facility will experience the more direct impact, with more populated residential areas further south being able to perceive less of the noise. Noise levels during construction and facility operations will not exceed acceptable limits of OSHA regulations, will be temporary and localized in nature, and will not adversely impact or add stress to the environment or its human and biological inhabitants.

9.8.6.6 Biological Environment

Coastal and Submerged Aquatic Vegetation

Calcasieu Parish Facility

Affected Resources

The project is within the northern portion of the Western Gulf Coastal Plain ecoregion which is typically characterized by relatively flat coastal plain and grassland habitats. Inland from this region, the plains are older and mostly forest or savanna-type habitats. The vegetation in the vicinity of the project area transitions from tidal brackish marsh to a narrow-band of live oak riparian habitat and coastal prairie to the south. The narrow band of tidal brackish marsh dominated by smooth cordgrass (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*) occurs along the unnamed tributary north of the proposed facility. On August 27th, 2013, no submerged aquatic vegetation was observed by HDR Engineering, Inc. ("HDR") in the unnamed tributary or the Turn Basin north of the project site, at the potential locations for outfall and intake structures, respectively. The tidal marsh is bordered by a narrow band of riparian woods containing live oak and pines with an understory dominated by yaupon (*Ilex vomitoria*).

The project site's history of cattle grazing, altered hydrology, fire suppression, and lack of brush management has resulted in the invasion of the coastal prairie by Eastern baccharis (*Baccharis halimifolia*) and Chinese tallow (*Triadica sebifera*), which have altered the natural vegetative community. The project site consists of a matrix of depressional wetlands within the upland areas on the site. The uplands are dominated by Eastern baccharis, Chinese tallow, southern bayberry (*Myrica cerifera*), goldenrod (*Solidago spp.*), and bermudagrass (*Cynodon dactylon*). Vegetation observed in wetland depressions include cattail (*Typha spp.*), sand spikerush (*Eleocharis montevidensis*), roundhead rush (*Juncus validus*), buttonweed (*Diodia virginiana*), smartweed (*Polygonum hydropiperoides*), and creeping primrose-willow (*Ludwigia repens*). Due to previous grazing and alterations on the site, the encroachment and dominance by invasive shrub species has reduced the diversity of the wetland vegetation community, thus resulting in a diminished functional quality of the wetland depression matrix.

The proposed facility would obtain water for its operations from the Turn Basin and the treated effluent would be discharged to the unnamed tributary to the north of the proposed facility. The Turn Basin is located near Henry Pugh Road and is the proposed location of the intake pipeline (Figure 9-23). Most areas along the shoreline of the Turn Basin are lined with concrete matting and consist of few areas of natural vegetation. Little shoreline erosion was observed near the Turn Basin by HDR during a site visit on August 27, 2013. The existing shoreline vegetation includes both invasive and native plants dominated by species such as cordgrass (*Spartina spp.*), groundseltree, chinese tallow, black willow (*Salix nigra*), rouseau cane (*Phragmites australis*), and Mimosa spp.

The proposed location of the intake pipeline would begin at the Turn Basin and follow Big Lake Road south along its right of way ("ROW") to the 0.5-acre storage reservoir south of Joe Ledoux Road. Although the exact location of the pipeline has yet to be determined, the construction corridor would be

no wider than 50 feet and would stay within or as close to the road ROW as possible to minimize disturbance to adjacent upland forested habitat. Figure 9-23 illustrates a conceptual plan for the proposed intake and outfall pipeline locations. Upland areas along the Big Lake Road ROW are dominated by loblolly pine (*Pinus taeda*), yaupon (*Ilex vomitoria*), hackberry (*Celtis occidentalis*), and wax myrtle (*Morella cerifera*).

Environmental Consequences

Several sensitive natural vegetation communities were observed on the Calcasieu Parish facility site. The proposed facility will be located in the most heavily degraded portion of the property where native plants were cleared and non-native grasses were planted for livestock grazing. Siting the proposed facility in this area would minimize impacts to coastal prairie, a mima mound wetland complex at the southern portion of the site, and bottomland hardwood and brackish marsh located along the unnamed tributary and west of Big Lake Road. This plan would preserve the majority of the mima mound-wetland complex, brackish marsh, and bottomland forest for potential enhancement and outdoor environmental educational activities complementary to the mission of the facility. The construction of the facility, ponds, and parking areas would result in permanent impacts to the grassland and shrub habitat. Impacts to wetlands would be required to be mitigated through the Section 404 process that requires replacement of the functions and values of the wetlands affected by project implementation.

Construction of the water supply and outfall pipelines would require temporary disturbance of vegetation in the grassland, woodlands and tidal areas. However, impacts to large specimen trees would be avoided through design and the surface herbaceous vegetation could be restored with native species following construction.

Plaquemines Parish Facility

Affected Resources

Vegetation at the Plaquemines Parish Facility consists primarily of bermudagrass, ruderal vegetation, and other grasses and forbs typical of disturbed sites such as goldenrod (*Solidago spp.*) and sumpweed (*Iva annua*). Vegetation including chinese tallow, groundsel tree, golden rod, bermudagrass, alligator weed (*Alternanthera philoxeroides*) and wild cow pea (*Vigna luteola*) dominates the berms surrounding the production ponds. Due to the extensive, recent deposition of earthen material, most of the site is bare dirt with depressions where water has pooled.

Most of the constructed ponds were used for wetland plant propagation. However, since suspension of operations of the LSU AgCenter in 2011, pioneer wetland species that are characteristic of disturbed sites have invaded the ponds. Vegetative conditions within the ponds can be characterized as having low structural diversity and few plant strata. The majority of the ponds are dominated by species such as wild cow pea, smartweed, pond flat-sedge (*Cyperus odoratus*), common duck weed (*Lemna minor*), and angle-stem primrose-willow (*Ludwigia leptocarpa*) which create a generally uniform mat of vegetation. The fringes contain species such as cattail and giant reed (*Phragmites australis*) which provide the only structural diversity.

Environmental Consequences

Due to the extent of previous alterations of the site for agriculture and for construction and operation of the LSU AgCenter as well as current alterations associated with the processing and placement of earthen material, impacts to native vegetation communities from this proposed project are expected to be minor or non-existent. Rehabilitation of constructed ponds would result in the loss of vegetation that might have recruited since the suspension of AgCenter operations in 2011.

9.8.6.7 Terrestrial Wildlife Species (including birds)

Calcasieu Parish Facility

Affected Resources

The Calcasieu Parish facility is within the Western Gulf Coastal Plain ecological region, which is a sub-region of the Great Plains and covers the coastal plain from southwestern Louisiana to northeastern Mexico (Wiken *et al.* 2011). The region has a humid, sub-tropical climate with hot summers and mild winters. The region is marked by flat coastal plains, barrier islands, dunes, beaches, bays, estuaries, and tidal marshes. Prior to conversion to cropland, livestock grazing and urban development, the coastal prairies consisted of tallgrass prairie in southwest Louisiana and southeast Texas, transitioning to sandy plains in southern Texas and northeast Mexico. Native vegetation in the prairies included little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), yellow Indiangrass (*Sorghastrum nutans*), tall dropseed (*Sporobolus compositus*), silver bluestem (*Bothriochloa saccharoides*), and common curleymesquite (*Hilaria berlandieri*) in a mixture with hundreds of other herbaceous species. Dominant vegetation in coastal marsh communities typically consists of cordgrass (*Spartina* spp.), saltgrass (*Distichlis* spp.), needlerush (*Juncus roemerianus*), and saltmarsh bulrush (*Scirpus robustus*) (Wiken *et al.* 2011).

Typical wildlife of the Western Gulf Coastal Plain would include a diverse avian, mammalian, amphibian, reptile and invertebrate community, including species such as white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), ringtail (*Bassariscus astutus*), armadillo (*Dasypus novemcinctus*), swamp rabbit (*Sylvilagus aquaticus*), cottontail (*Sylvilagus floridanus*), northern yellow bat (*Lasiurus intermedius*), American alligator (*Alligator mississippiensis*), northern cricket frog (*Acris crepitans*), eastern narrow-mouthed toad (*Gastrophryne carolinensis*), small-mouthed salamander (*Ambystoma texanum*), alligator snapping turtle (*Macrochelys temminckii*), LeConte's sparrow (*Ammodramus leconteii*), Sprague's pipit (*Anthus spragueii*), least bittern (*Ixobrychus exilis*), yellow rail (*Coturnicops noveboracensis*), Wilson's snipe (*Gallinago delicata*), and many species of ducks and geese. The Calcasieu site's history of cattle grazing and modification of the natural vegetation community has altered the potential for terrestrial wildlife use of the site.

The August 2013 site visit, although not a formal survey, revealed very low avian diversity around the approximate footprint of the proposed multi-purpose facility, which was dominated by generalist and disturbance-tolerant species such as the American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), northern cardinal (*Cardinalis cardinalis*), and northern mockingbird (*Mimus polyglottos*). Snowy egrets (*Egretta thula*) and great egrets (*Ardea alba*) were observed in the unnamed tributary and may have colonial roosting and nesting sites (*i.e.* rookeries) along the tributary. A September 2013

survey of the potential intake pipeline corridor along Big Lake Road revealed more woodland avian species as well as brushy edge species including Carolina wren (*Thryothorus ludovicianus*), northern flicker (*Colaptes auratus*), pileated woodpecker (*Dryocopus pileatus*), red-bellied woodpecker (*Melanerpes carolinus*), American redstart (*Setophaga ruticilla*), Carolina chickadee (*Poecile carolinensis*), gray catbird (*Dumetella carolinensis*), brown thrasher (*Toxostoma rufum*), and belted kingfishers (*Ceryle alcyon*) adjacent to the unnamed tributary. Also, several raptor species were observed, including the black vulture (*Coragyps atratus*), red-tailed hawk (*Buteo jamaicensis*) and red-shouldered hawk (*B. lineatus*). In addition, signs of common generalist mammal species such as the raccoon (*Procyon lotor*) and the nine-banded armadillo (*Dasypus novemcinctus*) were also observed at the site.

No surveys or trapping surveys have been conducted for reptiles or amphibians at this site; however, the matrix of small depressional wetlands on the project site may provide cover and breeding areas for local populations. These depressions range from <0.1 acres to 1.2 acres in size and have various hydrological regimes. Many of these depressions may only have saturated soils and no standing water, while others may hold water for sufficient periods for amphibian breeding requirements. Typical southern Louisiana amphibians which may utilize the project site for breeding and cover include the southern leopard frog (*Rana sphenoccephala*), the gulf coast toad (*Bufo nebulifer*), Fowler's toad (*Anaxyrus fowleri*), eastern narrowmouthed toad (*Gastrophryne caroliniensis*), and green frog (*Lithobates clamitans*). Reptiles potentially present on the project site include green anole (*Anolis carolinensis*), five-lined skink (*Plestiodon fasciatus*), and eastern mud turtle (*Kinosternon subrubrum*).

Environmental Consequences

The Calcasieu Parish facility is planned primarily in areas with hydrology and vegetation previously affected by road and grazing activities. Shrub-nesting passerine habitat could experience minor impacts due to land clearing; however, the observed species were considered highly adaptable and tolerant of disturbance, so no substantial adverse effects to the population would be anticipated.

The current site plan would result in the loss of approximately 2.18 acres of small depressional wetland and upland pond areas that might provide cover and breeding habitat for common amphibians. However, the quality of these areas has been impacted due to historic alterations to the vegetative community resulting in the encroachment of shrubs and a likely reduction in the diversity of amphibian and reptile species. The loss of depressional wetlands could lead to short-term, lower reproductive success for species adapted to the lower quality habitats; however, similar habitat and/or higher quality habitat would remain around the planned facility (*i.e.* mima mound-wetland complex and tributary-marsh habitat). The proposed facilities would be located adjacent to Joe Ledoux Road and would create a moderate barrier to dispersal. However, mitigation required by Section 404 of the Clean Water Act would require the replacement of the functions and values of the wetlands adversely affected by the project.

Plaquemines Parish Facility

Affected Resources

The Plaquemines Parish facility is within the Mississippi Alluvial Plain eco-region which extends from southern Illinois south to the Gulf of Mexico. The Mississippi River watershed drains all or parts of thirty-one states, two Canadian provinces, and approximately 3.2 million square kilometers before the river finally reaches the Gulf (Griffith, 2010). This region has a humid subtropical climate where winters are generally mild and precipitation and temperatures increase from north to south. Prior to settlement and cultivation, bottomland forest covered most of the region. However, due to extensive agricultural development and levee systems, which affect the hydroperiod of the floodplain, this ecological region is the most altered in the U.S. (Griffith, 2010). The region is mostly a broad, flat alluvial plain with river terraces, swales, and levees providing the main elements of relief.

Native bottomland deciduous forest which covered the region before much of it was cleared included inundated river swamp forests containing bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*); frequently-flooded hardwood swamp forests consisting of water hickory (*Carya aquatica*), red maple (*Acer rubra*), green ash (*Fraxinus pennsylvanica*), and river birch (*Betula nigra*); and seasonally-flooded areas dominated by sweetgum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), laurel oak (*Quercus laurifolia*), Nuttall oak (*Q. nuttallii*), and willow oak (*Q. phellos*). The widespread loss of forest and wetland habitat has significantly impacted wildlife and bird populations in the region, although it is still a major bird migration corridor. Representative species in forested bottomlands of the alluvial plain include white-tailed deer, black bear (*Ursus americanus*), bobcat (*Felis rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon, swamp rabbit, wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), wood thrush (*Hylocichla mustelina*), yellow-throated vireo (*Vireo flavifrons*), American alligator, wading birds, ducks and geese (Griffith 2010).

The Plaquemines Parish site has been heavily impacted due to development, construction and operation of the LSU AgCenter and recent hurricanes. Vegetation observed at the Plaquemines Parish site in September 2013 consisted primarily of bermudagrass, ruderal vegetation, and other grasses and forbs typical of disturbed sites such as goldenrod (*Solidago* spp.) and sumpweed (*Iva annua*). Vegetation including chinese tallow, groundsel tree, golden rod, bermudagrass, alligator weed (*Alternanthera philoxeroides*) and wild cow pea (*Vigna luteola*) dominates the berms surrounding the production ponds. Due to the extensive, recent deposition of earthen material, most of the site is bare dirt with depressions where water has pooled.

Most of the constructed ponds were used for wetland plant propagation. However, since suspension of operations in 2011, pioneer wetland species which are characteristic of disturbed sites have invaded the ponds. Vegetative conditions within the ponds can be characterized as having low structural diversity and few plant strata. The majority of the ponds are dominated by species such as wild cow pea, smartweed, pond flat-sedge (*Cyperus odoratus*), common duck weed (*Lemna minor*), and angle-stem primrose-willow (*Ludwigia leptocarpa*) which create a generally uniform mat of vegetation. The fringes contain species such as cattail and giant reed (*Phragmites australis*) which provide the only structural diversity. At least 2-in of surface water is visible in each pond, and the soils are saturated.

No formal terrestrial species surveys were conducted, so a full inventory of wildlife was not obtained during the site visit. Due to the recent disturbance at the site, no evidence of common generalist mammalian species were observed. However, representative species could include the raccoon, armadillo, feral hog (*Sus scrofa*), and coyote (*Canis latrans*). Reptile and amphibian species that may use the site include rat snake (*Elaphe obsoleta*), green anole, gulf coast toad, northern cricket frog, and the red-eared slider (*Trachemys elegans*). Bird species observed during the September 2013 site visit included great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), great egret (*Ardea alba*), cattle egret (*Bubulcus ibis*), tricolored heron (*Egretta tricolor*), least sandpiper, killdeer (*Charadrius vociferus*), black-necked stilt (*Himantopus mexicanus*), greater yellowlegs (*Tringa melanoleuca*), mourning dove (*Zenaida macroura*), red-bellied woodpecker, and northern cardinal.

Environmental Consequences

Proposed construction would include restoration of existing access roads, plant propagation ponds and site buildings damaged in recent hurricanes. Pond construction would include the rehabilitation of ponds previously used for coastal plant propagation by re-grading, compaction and installation of water supply and water control structures. One new building, approximately 40ft by 60ft would be constructed. All proposed construction would be completed in areas previously impacted by the LSU AgCenter.

Dredging and rehabilitation of the on-site constructed ponds would remove herbaceous wet-edge habitat that could have developed since suspension of management operations. This could result in minor adverse effects to wildlife which may have utilized these edge habitats over the past two years, including wading birds, reptiles and amphibians. Due to the extent of previous alteration and current ground disturbance activities, adverse environmental consequences to terrestrial wildlife and avian species would be minor.

Environmental Consequences – Both Facilities

The construction of aquaculture ponds for the brooding and rearing of bait fish and commercial sport fishes could attract piscivorous bird species, such as herons, cormorants, egrets, kingfishers, and ducks, as well as mammals such as raccoons. Damage prevention and/or control strategies for managing bird damage and/or losses at each of the proposed facilities would be assessed during project development. Any prevention or control measures deemed necessary would be established in compliance with the Migratory Bird Treaty Act and LDWF regulations. Ground-clearing construction activities would be conducted outside of the avian nesting season, March 15 to September 15, to avoid direct impacts to nesting birds, in accordance with the Migratory Bird Treaty Act. If the project schedule should require ground-clearing activities during this time, pre-construction nest surveys of areas to be cleared would be conducted by a qualified biologist.

9.8.6.8 Marine and Estuarine Fauna (fish, shell beds, benthic organisms)

Both Facilities

Affected Resources

The Magnuson-Stevens Fishery Conservation and Management Act is the primary law governing marine fisheries management in Waters of the United States. The Magnuson-Stevens Act defines essential fish habitat (“EFH”) as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The National Marine Fisheries Service and Gulf of Mexico Fishery Management Council have identified EFHs for the Gulf of Mexico in its fishery management plan amendments. Fishery management plans developed by the Gulf of Mexico Fishery Management Council include plans for shrimp, red drum, stone crab, and reef fish. There is also a federally implemented fishery management plan for small coastal sharks.

The southwest region (Calcasieu Parish facility) and the southeast region (Plaquemines Parish facility) are tidally influenced and support a wide variety of living aquatic resources including resident and migratory fishes, crustaceans, and benthic invertebrates. Some of these species are federally managed, and EFH has been designated for multiple species and life stages in the areas surrounding the Calcasieu Parish facility and Plaquemines Parish facility. These regions typically include but are not limited to, estuarine emergent wetlands (e.g., marsh edge, inner marsh, marsh ponds, and tidal creeks); submerged aquatic vegetation; seagrasses; mud, sand, shell, and rock substrates (e.g., oyster reefs and barrier island flats); mangrove wetlands; and estuarine water column. Habitats currently represented at both facilities include estuarine emergent wetlands.

Detailed information on EFH is provided by the Gulf of Mexico Fishery Management Council (1998, 2004, 2005, 2009, and 2011) for a variety of life stages of brown shrimp, white shrimp, red drum (*Sciaenops ocellatus*), Gulf stone crab (*Menippe adina*), gray snapper (*Lutjanus griseus*), dog snapper (*Lutjanus jocu*), lane snapper (*Lutjanus synagris*), bonnethead shark (*Sphyrna tiburo*), Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), and blacknose shark (*Carcharhinus acronotus*). Table 9-7 presents species-specific EFH requirements during various life stages of the 10 Federally-managed species known to reside in Gulf of Mexico waters and managed by the Magnuson-Stevens Act. These species could occur in the vicinity of the Calcasieu and Plaquemines Parish facilities. The five applicable fishery management plan authorities for the Gulf of Mexico, and individual species covered by those plans for which EFH was designated, are discussed below. All are applicable to the Plaquemines Parish facility, but for the Calcasieu Parish facility, only the red drum is managed under the EFH in the Gulf of Mexico. This species appears to have a year-round presence that extends into the Calcasieu River (NOAA 2011).

Table 9-7. Designated EFH for listed federally managed species by various life stages identified for Plaquemines and Calcasieu Parishes.

SPECIES	LIFE STAGE	SYSTEM ¹	DESIGNATED EFH
Brown shrimp <i>Farfantepenaeus aztecus</i>	Eggs	M	18-110 m; sand/shell/soft bottom
	Larvae	M/E	<82 m; planktonic; sand/shell/soft bottom, SAV, emergent marsh, oyster reef
	Juvenile	E	<18 m: SAV, sand/shell/soft bottom, emergent marsh, oyster reef
	Adult	M	<14-110 m; sand/shell/soft bottom
White shrimp <i>Litopenaeus setiferus</i>	Eggs	M	9-34 m; sand/shell/soft bottom
	Larvae	M/E	<82 m; planktonic; soft bottom, emergent marsh
	Juvenile	E	<30 m; SAV, soft bottom, emergent marsh
	Adult	M	9-34 m; sand/shell/soft bottom
Red Drum <i>Sciaenops ocellatus</i>	Eggs	M	<46m; nearshore and offshore Gulf of Mexico (GOM)
	Larvae/Postlarvae	E	All estuaries; planktonic, SAV, sand/shell/soft bottom, emergent marsh
	Juvenile	M/E	GOM <5 m; all estuaries, SAV sand/shell/soft/hard bottom, emergent marsh
	Adult	M/E	GOM 1-46 m; all estuaries SAV, pelagic, sand/shell/soft/hard bottom, emergent marsh
Gulf stone crab ² <i>Menippe adina</i>	--	--	REPEALED effective 10-24-11
Gray snapper <i>Lutjanus griseus</i>	Eggs	M	Pelagic; offshore shelf waters, coral reefs
	Larvae	M	Pelagic ; offshore shelf waters, coral reefs
	Post larvae/Juvenile	M/E/F	Coastal waters, estuaries, rivers, mangrove
	Adult	M/E/F	Coastal waters, estuaries, rivers in shallow vegetated areas to deep shelf bank reefs
Dog snapper ³ <i>Lutjanus jocu</i>	--	--	REPEALED effective 1-30-12
Lane snapper <i>Lutjanus synagris</i>	Eggs	M	4-132 m; pelagic
	Larvae	E/M	4-132 m; reefs, SAV
	Juvenile	E/M	<20 m; SAV, mangrove, reefs, sand/shell/soft bottom
	Adult	M	Pelagic 4-132 m ; offshore sand bottoms, reefs
Bonnethead shark <i>Sphyrna tiburo</i>	Adult	M	Shallow coastal waters <25 m over muddy and sandy bottoms
Atlantic sharpnose shark <i>Rhizoprionodon terraenovae</i>	Neonate/YOY ⁴	M	Inlet, estuaries, coastal waters <25 m
	Juvenile	E/M	Shallow coastal waters <25 m; estuaries and bays
	Adult		
Blacknose shark <i>Carcharhinus acronotus</i>	Adult	M	Pelagic; Offshore coastal waters over a variety of bottom types

Sources: GMFMC, 1998, 2004, 2005, 2011

M=Marine; E=Estuarine; F=Freshwater

GMFMC, 2011; NMFS, 2013

NMFS, 2013

Newborn/Young-of-year

Shrimp Fishery Management Plan

Commercially, the white and brown shrimp are the two important penaeid species along the Atlantic and Gulf coasts. Spawning and larval development of these two species occur in the Gulf. They have similar life history stages, are estuarine-dependent and vary seasonally in abundance. Brown shrimp utilize the same nursery grounds as the white shrimp during the growth period from the post larval stage to the adult stage. Marine shrimp are omnivorous scavengers, their diet include polychaetes, nematodes, fish tissue, algae and plant matter. Young brown shrimp move into the estuaries during the late winter and spend several months feeding before beginning the return journey to the Gulf of Mexico to spawn. They normally reach harvestable size and congregate in open bays during May. White shrimp behave similarly but the postlarvae do not reach inshore waters until early summer when brown shrimp are moving out. White shrimp move offshore in the fall when cooling water temperatures trigger a return migration (LSU, 1999).

Red Drum Fishery Management Plan

The red drum occurs in a variety of habitats over different substrates throughout the Gulf of Mexico. Habitats range in depth from about 40 meters offshore to very shallow in estuarine wetlands with substrates that include sand, mud and oyster reefs (GMFMC, 1998). There exists a general Gulfward migration in the late fall and a bayward movement in the spring. After spawning occurs in the Gulf, the planktonic larvae are carried by tidal currents into the quiet, shallow water of estuaries preferring areas with grassy clumps or slightly muddy bottoms. Juveniles develop and become abundant in the shallow water areas in late fall and move into deeper water of the bay as the weather becomes colder, and many may leave the bay systems while others remain. Adults are roving marine predators that opportunistically feed both on and off the bottom on a variety of invertebrate and vertebrate prey including marine worms, crab, shrimp and other fishes.

Stone Crab Fishery Management Plan

NOAA Fisheries Service and the Gulf of Mexico Fishery Management Council conducted a review of all their fishery management plans in 2010 and 2011. It was decided to repeal the Fishery Management Plan for the Stone Crab Fishery of the Gulf of Mexico effective October 24, 2011. Since the stone crab fishery operates primarily in state waters off the coast of Florida, the Florida Fish and Wildlife Conservation Commission voted to extend its management of this fishery into Federal waters (GMFMC, 2011).

Reef Fish Fishery Management Plan

Wetlands and water bottoms have been designated as EFH for the juvenile stage of three species of snapper: gray snapper (*Lutjanus griseus*), dog snapper (*L. jocu*), and lane snapper (*L. synagris*). After Gulf of Mexico Fishery Management Council review of this fishery management plan, the dog snapper was removed from federal protection effective January 30, 2012 (NMFS, 2013b). Gray snapper are found year round on tropical coral reefs in the southern Atlantic and Caribbean, and on live bottom and artificial reefs in the Gulf of Mexico and Mid-Atlantic States. Also known as mangrove snapper, this species is common around mangroves, SAV beds, and coral reefs over muddy, sandy, and rocky substrates. Spawned in offshore pelagic shelf waters, the planktonic larvae migrate inland as the post-larvae begin to utilize shoalgrass and manatee grass beds. Juveniles are found in turtlegrass beds, SAV

meadows, marl bottoms, and mangrove roots within estuaries, bayous, channels, SAV beds, marshes, mangrove swamps, ponds and freshwater creeks (GMFMC, 1998). Adults are found both near-shore and offshore at depths between 90 and 600 feet over hard-bottomed substrates including rocks, ledges, wrecks, and coral reefs. The lane snapper exhibits a similar life history cycle. Spawning occurs offshore, the pre- and post-larvae migrate into vegetated estuaries, while juveniles begin to utilize grass flats, reefs, and offshore areas to depths of 66 ft. (20 m). Adults occupy a wide range of offshore habitats including natural and artificial hard surfaced bottoms and soft mud bottoms in water with salinities near 35 ppt (GMFMC, 2004).

Federally Implemented Fishery Management Plan, Small Coastal Sharks

Portions of southern Louisiana near the Gulf of Mexico also serve as EFH for the neonate (newborn), juvenile, and adult life stages of Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), and for adult bonnethead shark (*Sphyrna tiburo*), and blacknose shark (*Carcharhinus acronotus*) (NMFS 2009).

Typically sharks move inshore during March and April, remain inshore during the summer and early fall and then relocate offshore around October. When compared to the larger shark species, these small coastal sharks exhibit relatively productive life history strategies such as rapid growth, early maturity, and annual reproduction in addition to high population growth rates. The Atlantic sharpnose shark, one of the smallest coastal shark species, spawn and hatch offshore, migrate to coastal bays during the spring and move among adjacent bays during summer. They are tolerant of low salinities often entering rivers and are common in bays, estuaries, and shallow offshore areas. The EFH for the early life stages (e.g., neonate/young-of-year/juvenile) of the bonnethead and blacknose sharks have relatively small geographical ranges in the Gulf of Mexico while each adult stage is widely distributed. Development of young bonnethead shark occurs in the continental shelves, shallow bays, and estuaries found along the Texas, Mississippi, Alabama, and Florida coastlines. Adults begin to expand their territory to include the coastal waters of Louisiana and are typically found in depths ranging from 32 to 262 feet where they feed upon small fish and invertebrates. Young blacknose sharks utilize the shallow muddy and sandy channels adjacent to seagrass habitats along the Atlantic coastlines of North Carolina, South Carolina, Georgia, and Florida, and the Gulf of Mexico coastlines of Florida and Alabama. Adults extend their range into the coastal waters of Mississippi, Louisiana, and Texas.

Environmental Consequences

This section describes the potential project impacts at both facilities to marine and estuarine fauna, including EFH as a result of facility construction and operation. EFH found at both facilities include emergent wetlands, oyster reefs, estuarine water column, and estuarine unconsolidated substrate. Riverine habitat and emergent wetlands habitat near the two proposed facilities could potentially function as EFH during periods of inundation for the following species: juvenile and adult brown and white shrimp, larval to adult red drum, juvenile and adult gray snapper and blacknose shark, juvenile lane snapper, and adult bonnethead shark. Of these, gray snapper and the three shark species, are considered rare or not present in the Calcasieu or Mississippi rivers, and therefore, are not likely to occur in the vicinity of the two proposed facilities.

In addition to being designated as EFH, the tidally influenced wetlands, seagrass, mud, clay, and sand substrates and shallow water habitats in the vicinity of both facilities provide nursery, foraging and

refuge habitats that support various recreationally and economically important marine fishery species such as spotted seatrout (*Cynoscion nebulosus*), southern flounder (*Paralichthys lethostigma*), Atlantic croaker (*Micropogonias undulatus*), black drum (*Pogonias cromis*), Gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*) and blue crab (*Callinectes sapidus*). Such estuarine-dependent species serve as prey for other managed fisheries such as red drum, snappers and sharks.

Calcasieu Parish Facility

Construction of the facility could impact EFH in the vicinity of the proposed intake and outfall structures. Impacts to habitats would be limited to the bottom sediment and water column. The extent of area affected during site construction would primarily depend on the dimensions of construction easements. Direct impacts to EFH bottom sediments would occur from removal of habitat during excavation, disturbance or destruction of habitat from pipeline installation, and conversion of bottom substrate along some portion of the proposed pipeline (soft bottom substrate would be converted to hard structure) at the placement of the water intake structure. Trenching of sediment to install the proposed pipeline and intake would directly impact EFH through disturbance and/or conversion of benthic habitat.

Installation could result in a short-term loss of the benthic forage organisms that juvenile and adult fish species feed upon. The number of organisms impacted in this way would be minor, and would not result in population level impacts. The intake of water from the Turn Basin could result in the minor entrainment and impingement of aquatic organisms; however, this is expected to be minor because the intake screen and location would be designed to minimize entrainment and impingement of organisms.

A narrow band of 2.02-acres of tidal wetlands composed of smooth cordgrass (*Spartina alterniflora*), bulrush, cattail, and groundsel tree dominate the outfall area proposed for the Calcasieu Parish facility. However, since growth was sparse and located above the tide line, this area would not function as fish habitat. Because there was no submerged aquatic vegetation observed at the Calcasieu Parish facility, no construction impacts to EFH would be anticipated.

During the construction and operation of the facility, water will be supplied from the Turn Basin into storage reservoir ponds located within the proposed project site. Water from the source water supply systems would be micro-screened, UV disinfected, and sand filtered before use in the facility to reduce pollutant discharge and fish interception from the Turn Basin. The amount of water withdrawal from the Turn Basin is anticipated to be minimal compared to the amount of water already present; therefore, there will be little to no effect on water quality of EFH anticipated as a result of water withdrawn from the Turn Basin.

The facility would employ RAS technology to increase overall efficiency and reduce source water volume requirements. The indoor systems would be expected to operate using 95 to 99 percent re-circulation with water treatment. The amount of water withdrawal from the Turn Basin is anticipated to be minimal compared to the amount of water already present; therefore, little to no effects on EFH is anticipated as a result of water withdrawal.

Operation of the Calcasieu Parish Facility would result in long-term, minor impacts to an unnamed tributary of the Intracoastal Waterway from the discharge of effluent water (see Figure 9-23 for location

of tributary). It is expected that this impact on the water quality of the EFH would be minor because the treatment of effluent in lined, 0.5-acre settling ponds would be designed to meet applicable LPDES discharge standards. These effluent ponds would incorporate drainage structures used to dry the ponds for the removal of sediment to reduce potential turbidity in receiving waters.

If found in proximity to construction activities, oysters could be temporarily affected by elevated suspended sediment concentrations similar to episodic increases caused by vessel traffic and storm events; however, only minor temporary impacts are expected.

The estuarine water column is sensitive to the vertical and horizontal distributions of waterborne constituents such as salinity, temperature, dissolved oxygen, nutrients, turbidity, all influenced directly by freshwater inflow from inland sources.

Temporary and minor direct impacts to the bottom sediment disturbed by equipment during the construction phase and the estuarine water column would result from the incidental suspension of solids and turbidity, the release of potential contaminants contained within the sediments, and a reduction in the dissolved oxygen (DO) levels in the area as a result of the release of oxygen demanding materials such as organic materials contained within the sediments. Any impact associated with contaminated sediments, if such sediments are present, would be insignificant and temporary. Theoretically, DO concentrations along the proposed pipeline corridor could be reduced however; any impacts would be localized and temporary.

The most likely impact to shellfish and finfish from construction activities in the water would be temporary behavioral or avoidance of the area. The duration of avoidance for these species would be determined by construction time expended in/near the water, but a rapid return to normal distribution and behavior would be anticipated. EFH supporting all life stages of red drum have been identified in the area of the proposed pipeline route. Due to their mobility, this EFH-managed species would be able to escape the construction area. Benthic organisms, such as clams, worms, and other infauna within the construction area would be directly affected. Larger, more mobile benthic and epibenthic species would experience temporary displacement. Since construction activities would not have a substantial effect on sessile species occupying a small portion of the open water benthic community, the species inhabiting the areas of construction activity would be expected to re-establish from adjacent populations. Therefore, impacts would not be expected to be long-term or significant.

During the construction of the facility, equipment and transport vehicles could potentially release minor amounts of petroleum products into the water system and wetland areas through operational use and spillage. Given the small footprint of the facility, pollutants released during facility construction will result in minor impacts to EFH. Water quality impacts to the pelagic water column could occur as a result of accidental spills of petroleum lubricants and fuel during pipeline construction. Impacts from hydrostatic testing of the pipeline could occur from toxic effects of chemical additives after discharge of the used test water. Hydrostatic test water should be treated, and discharges would be conducted in accordance with applicable Louisiana Pollution Discharge Elimination System (LPDES) requirements.

BMPs such as turbidity curtains, erosion control screens, and staked hay bales would be used to reduce or eliminate erosion and elevated turbidity during the construction phase. Overall, impacts would be minor because of the small footprint of the intake/outfall structures in the waterways near both facilities. In the long term, the aquatic community could benefit from the facilities' research activities that have a potential to improve management of marine species.

The release of hatchery-produced fish will occur as part of LDWF's research and management programs and is not intended to affect local or regional native stock. Thus, no adverse impacts to federally-managed species are expected to result from introduction of hatchery produced specimens.

Plaquemines Parish Facility

During the construction and operation of the facility, water will be supplied from the Mississippi River into storage reservoir ponds located within the proposed project site. Water from the source water supply systems would be micro-screened, UV disinfected, and sand filtered before use in the facility to reduce pollutant discharge and fish interception from the Mississippi River. The amount of water withdrawal from the Mississippi River is anticipated to be minimal compared to the amount of water already present; therefore, there will be little to no effect on EFH water quality as a result of water withdrawn from the Mississippi River is anticipated.

The facility would employ RAS technology to increase overall efficiency and reduce source water volume requirements. The indoor systems would be expected to operate using 95 to 99 percent re-circulation with water treatment. The amount of water withdrawal from the Mississippi River is anticipated to be minimal compared to the amount of water already present; therefore, little to no effects on EFH is anticipated as a result of water withdrawal.

Operation of the Plaquemines Parish facility would result in long-term, minor impacts to an inland marsh of the Barataria Estuary from the discharge of effluent water. The water leaving the effluent ponds would enter an existing drainage ditch system that crosses LA 23 and discharges into an inland marsh of the Barataria Estuary. These effluent ponds would incorporate drainage structures used to dry the ponds for the removal of sediment to reduce potential turbidity in receiving waters. This impact on EFH water quality would be expected to be minor because the treatment of effluent in 0.5 acre settling ponds would be designed to meet applicable LPDES discharge standards.

Since no extensive, open water habitat will be adversely affected by this project, impacts to EFH bottom sediment, EFH estuarine water column, and EFH-managed species during active over-land construction would be minor and largely temporary. Erosion controls would be implemented to prevent discharges of storm water runoff that can have a significant impact on sediment transport and water quality to receiving waters.

The primary operational impact to EFH-managed species during operation of the proposed Plaquemines Parish facility would be impingement and/or entrainment in the renovated existing Mississippi River water pumping system and related piping systems. Mortality of mobile species in both juvenile and adult life stages would not be expected, but these species would be temporarily displaced from their habitat. Water intake velocity of 0.5 foot per second or less reduces the potential for fish egg and larval

mortality through the impingement and/or entrainment of ichthyoplankton. Because the estimated impingement/entrainment usually represents such a small percentage of the general standing crop of EFH-managed species in general, these impingement/entrainment losses are not expected to affect the general finfish population within the Mississippi River, nor specifically the EFH-managed species. EFH related to water resources associated with water intakes are considered minor, but long term because they would continue for the life of the proposed facility.

If found in proximity to construction activities, oysters could be temporarily affected by elevated suspended sediment concentrations similar to episodic increases caused by vessel traffic and storm events; however, only minor temporary impacts are expected.

Temporary and minor direct impacts to the bottom sediment and water column would result from the incidental suspension of substrate disturbed by equipment during the construction phase. The most likely impact to shellfish and finfish from construction activities in the water would be temporary behavioral or avoidance of the area. The duration of avoidance for these species would be determined by construction time expended in/near the water, but a rapid return to normal distribution and behavior would be anticipated. Benthic organisms, such as clams, worms, and other infauna within the construction area would be directly affected. Larger, more mobile benthic and epibenthic species would experience temporary displacement. Since construction activities would not have a substantial effect on sessile species occupying a small portion of the open water benthic community, the species inhabiting the areas of construction activity would be expected to re-establish from adjacent populations. Therefore, impacts would not be expected to be long-term or significant.

During the construction of the facility, equipment and transport vehicles could potentially release minor amounts of petroleum products into the water system and wetland areas through operational use and spillage. Given the small footprint of the facility, pollutants released during facility construction would result in minor impacts to EFH.

BMPs such as turbidity curtains, erosion control screens, and staked hay bales would be used to reduce or eliminate erosion and elevated turbidity during the construction phase. Overall, impacts would be minor because of the small footprint of the intake/outfall structures in the waterways near both facilities. In the long term, the aquatic community could benefit from the facilities' research activities that have a potential to improve management of marine species.

The production of baitfish is not intended to affect local or regional native stock. Thus, no adverse impacts to federally-managed species are expected to result from introduction of hatchery produced specimens.

9.8.6.9 Protected Species

Both Facilities

Affected Resources

Plants and animals with federal classifications of Endangered or Threatened are protected under the Endangered Species Act (ESA), as amended. In addition, Candidate species have sufficient information to

warrant listing, but statutory protection is precluded by higher listing priorities. Section 7 of the ESA requires federal agencies to consult with the USFWS or National Marine Fisheries Service regarding any actions that may adversely affect listed species. Protection is also afforded to Louisiana state-listed species, and the LDWF enforces the state regulations.

Based on the USFWS Critical Habitat Mapper (<http://criticalhabitat.fws.gov/crithab/flex/crithabMapper>) no critical habitat for federally listed species has been designated within the Plaquemines Parish or Calcasieu Parish project locations. Species habitat requirements, aerial photographs, and street level views (Google Maps) were reviewed to determine if potential habitat exists for any federal or state-listed species. For the Calcasieu facility, determination of the presence or absence of suitable habitat is based on a review of species' habitat requirements and field observations from an August 2013 site visit. Federal- and state-listed species and the habitat determinations for both facilities are included in Table 9-8.

Table 9-8. Endangered, threatened, and rare species with potential to occur at the proposed facilities in Calcasieu and Plaquemines Parishes.

COMMON NAME/ SCIENTIFIC NAME	LISTING STATUS	FACILITY	PREFERRED HABITAT AND POTENTIAL FOR OCCURRENCE
Piping plover <i>Charadrius melodus</i>	Federal: Threatened State: Threatened	Plaquemines	Habitat: Open, sparsely vegetated coastal beaches Potential: No suitable habitat
Peregrine falcon <i>Falco peregrinus</i>	Federal: None State: Threatened	Plaquemines	Habitat: Open areas along the coast Potential: Yes, facility ponds may attract birds which are prey for falcons
Bald eagle <i>Haliaeetus leucocephalus</i>	Federal: Delisted State: Endangered	Calcasieu, Plaquemines	Habitat: Nests in large trees near open water, primarily in southeast LA Potential: Yes, potential winter habitat available in the bottomland forested areas on the Calcasieu property
Brown pelican <i>Pelecanus occidentalis</i>	Federal: Delisted State: Endangered	Plaquemines	Habitat: Bays, tidal estuaries or along the coast, nests in shrub thickets within dunes of barrier islands, feeds in deep and shallow coastal waters Potential: No suitable habitat
Red-cockaded woodpecker <i>Picoides borealis</i>	Federal: Endangered State: Endangered	Calcasieu	Habitat: Mature, longleaf pine savannah Potential: No suitable habitat
Sprague's pipit <i>Anthus spragueii</i>	Federal: Candidate State: None	Calcasieu, Plaquemines	Habitat: Open prairie or fields Potential: Low, former agricultural pasture at Plaquemines facility may have suitable wintering habitat
Red wolf <i>Canis rufus</i>	Federal: Endangered State: Extirpated	Calcasieu	Habitat: Upland and lowland forest, shrubland, river bottoms, coastal prairies and marshes Potential: No, believed to be extirpated from LA
West Indian manatee <i>Trichechus manatus</i>	Federal: Endangered State: Endangered	Plaquemines	Habitat: Marine open water, bays, and rivers Potential: No suitable habitat
Green sea turtle <i>Chelonia mydas</i>	Federal: Threatened State: Threatened	Plaquemines	Habitat: Warm bays and oceans, seagrass beds, estuaries; mainland beaches and islands Potential: No suitable habitat
Hawksbill sea turtle <i>Eretmochelys imbricata</i>	Federal: Endangered State: Endangered	Plaquemines	Habitat: Warm bays and shallow portions of oceans; seagrass beds; estuaries; mainland beaches and islands (nesting). Potential: No suitable habitat
Kemp's Ridley sea turtle <i>Lepidochelys kempii</i>	Federal: Endangered State: Endangered	Plaquemines	Habitat: Warm bays and coastal waters; tidal rivers; estuaries; sea grass beds; sandy coastal beaches are used for nesting. Potential: No suitable habitat
Leatherback sea turtle <i>Dermochelys coriacea</i>	Federal: Endangered State: Endangered	Plaquemines	Habitat: Open ocean and deeper waters of the Gulf and coastal bays; coastal beaches and barrier islands (nesting). Potential: No suitable habitat
Gulf sturgeon <i>Acipenser oxyrinchus desotoi</i>	Federal: Threatened State: Threatened	Plaquemines	Habitat: All saltwater habitats, except during the spawning season when it is found in major rivers that empty into the Gulf of Mexico Potential: No suitable habitat

COMMON NAME/ SCIENTIFIC NAME	LISTING STATUS	FACILITY	PREFERRED HABITAT AND POTENTIAL FOR OCCURRENCE
Pallid sturgeon <i>Scaphirhynchus albus</i>	Federal: Endangered State: Endangered	Plaquemines	Habitat: Large rivers in Southeast United States, prefers the main channels of excessively turbid rivers in areas with strong currents over firm sandy bottom Potential: No suitable habitat
Sources: USFWS Information, Planning, and Conservation System (IPaC) Official Species List for Plaquemines and Calcasieu Project Locations (September 12, 2013), Louisiana Natural Heritage Program - Species by Parish Lists for Calcasieu and Plaquemines Parishes (September 12, 2013), LDWF Rare Animal and Plant Tracking Lists and Fact Sheets, NatureServe Explorer (http://www.natureserve.org/explorer/), Native Plant Information Network (http://www.wildflower.org/explore/).			

Environmental Consequences

Suitable habitat could be present at one or both facilities for the peregrine falcon, bald eagle, and Sprague's pipit.

The peregrine falcon typically nests on cliffs in the north and western regions of the U.S., and it has been documented using buildings for nesting in the eastern U.S. Historically, breeding falcons have also used cavities in large trees in the southern U.S. Wintering falcons are typically found in open coastal areas, where they feed primarily on other birds, including small passerines, shorebirds, doves, pigeons, and ducks. No suitable nesting habitat occurs at either project location; however, the hatchery ponds may attract piscivorous bird species which may be prey for wintering falcons. No suitable roosting habitat occurs at either project location, so falcons would not use either site for cover or roosting, but a transient foraging falcon could be observed feeding at a site. Due to the lack of suitable habitat and transient occurrence of a foraging falcon, the proposed projects are not likely to adversely affect the species.

The bald eagle is a large raptor which breeds and winters across the U.S. and North America. Eagles typically nest near open water bodies in large trees but also may nest in other structures capable of supporting the large stick nests. Wintering eagles use similar habitat during the winter, including major river corridors, large lakes and reservoirs, and coastal areas. In Louisiana, the bald eagle breeds mostly in river and coastal areas of southeast Louisiana. Wintering eagles may occur along other rivers and lakes or reservoirs across Louisiana. Eagles are primarily piscivorous but also steal food from other raptors and scavenge available carrion. The bald eagle may occur at either facility as a transient forager, but the lack of suitable roosting and nesting habitat at the sites precludes the occupation of the project areas by a breeding or wintering eagle. Due to the lack of suitable habitat and transient occurrence of a foraging eagle, the proposed projects are not likely to impact the species.

The Sprague's pipit is a small, cryptic, prairie grassland bird which breeds in the northern U.S. and Canada and winters in the southern U.S. and northern Mexico. The Sprague's pipit prefers dry, open grasslands with no shrubs or trees to breed and winter. The pipit is strictly a ground nesting species and feeds primarily on insects and seeds. The pipit has been declining due to conversion of grassland to agriculture and grazing. The project locations are within the wintering range of the pipit; however, only a 1.5 acre portion of the Plaquemines Parish facility site, on the southwest side of Highway 23, may contain suitable wintering habitat. Due to the small size of this parcel and historic agricultural use of the site, the proposed impacts are not likely to impact the Sprague's pipit.

Consultation under the ESA will be initiated with USFWS to evaluate potential impacts to listed, proposed, or candidate species. Any measures determined necessary by USFWS or LDWF to avoid or minimize impacts to listed or otherwise protected species will be implemented by the Trustees.

9.8.6.10 Human Uses and Socioeconomics

9.8.6.10.1 Socioeconomics and Environmental Justice

Calcasieu Parish Facility

Affected Resources

The Calcasieu Parish facility is located entirely in Calcasieu Parish, near the Calcasieu River and several lakes and canals. The land near the facility is characteristic of rural lands developed for residential areas and port-side industries.

In 2010, the total population of the block group intersecting the Calcasieu Parish facility was 10,014. According to the U.S. Census Bureau, the population of Calcasieu Parish has increased by about five percent over the past 10 years from 183,577 in 2000 to 192,768 in 2010. Approximately 13 percent of the population in the block group intersecting the Calcasieu Parish facility is considered to be minority. By contrast, 29 percent of the Calcasieu Parish population is considered to be minority.

The block group containing the Calcasieu Parish facility has a median household income of \$40,852, which is above the 2011 HHS poverty guideline. The median household income for Census Tract 1800 (which includes this block group) is \$46,037.

Environmental Consequences

The proposed project would not be expected to change the socioeconomic conditions surrounding the Calcasieu Parish facility or generate pressure on housing or public services that could not be absorbed by the existing infrastructure. The proposed project would be anticipated to support community cohesion by providing permanent and temporary employment for local residents. As estimated by LDWF, the proposed project would create 8 permanent jobs (1 manager, 1 supervisor, 3 biologists, and 3 technicians). The project engineer estimates that 30 construction related jobs would be generated for 18 months during the construction of the facility. Beneficial economic effects would be associated with the project (employment and visitors).

Environmental Justice Analysis

In this analysis, an analytical unit, such as a block group, census tract, or parish, is considered to have a minority population if its nonwhite population is greater than 50 percent or is meaningfully larger than the general (statewide) nonwhite population. Low-income areas are defined as areas in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater than the general population (average statewide poverty level). To make a finding that disproportionately high and adverse effects would likely fall on minority or low-income populations, three conditions must be met simultaneously:

- There must be a minority or low-income population in the impact zone.

- A high and adverse impact must exist.
- The impact must be disproportionately high and adverse on the minority or low-income population

The Trustees find that this project location does not meet any of the criteria for determining that disproportionately high and adverse effects would likely fall on minority or low-income populations. There are no identified minority and low income populations located in the vicinity of the Calcasieu Parish site. Furthermore, there are no high and adverse impacts anticipated from the proposed project.

Plaquemines Parish Facility

Affected Resources

The Plaquemines Parish facility is adjacent to the Mississippi River and many of the commercial and industrial developments in the area depend on fisheries and on marine vessels utilizing the river for trade and transport. The land surrounding the Plaquemines Parish facility is used for industrial and agricultural uses.

In 2010, the total population of the U.S. Census Bureau block group intersecting the project area was 834. According to the U.S. Census Bureau, the population of Plaquemines Parish has decreased by about 14 percent over the past ten years from 26,757 in 2000 to 23,042 in 2010.

Approximately 65 percent of the population in the block group (Block Group 1 of Census Tract 504) intersecting the project area is considered to be minority. Approximately 13 percent of the population in the census tract containing the Plaquemines Parish facility is considered to be minority, whereas Plaquemines Parish as a whole is approximately 30 percent minority.

The block group containing the Plaquemines Parish facility has a median household income below the poverty guideline. Block Group 1 of Census Tract 504 has a median household income of \$19,405 while the whole of Census Tract 504 has a median household income of \$36,354.

Environmental Consequences

The proposed project would not be expected to change the socioeconomic conditions surrounding the Plaquemines Parish facility or generate pressure on housing or public services that could not be absorbed by the existing infrastructure. Although the immediate area surrounding the project site has a significant minority population, the proposed project would not result in adverse impacts to these groups. The proposed project would be anticipated to support community cohesion by providing several permanent and temporary jobs for local residents. As estimated by LDWF, the proposed project would generate 3 permanent positions (2 biologists, 1 technician). The project engineer estimates that 20 construction related jobs would be generated for 12 months during the construction of the facility. There would be beneficial economic effects associated with the increased temporary and permanent employment and income generated by visitors.

Environmental Justice Analysis

As described above, to make a finding that disproportionately high and adverse effects would likely fall on minority or low-income populations, three conditions must be met simultaneously:

- There must be a minority or low-income population in the impact zone.
- A high and adverse impact must exist.
- The impact must be disproportionately high and adverse on the minority or low-income population

The Trustees find that this project location does not meet the criteria for determining that disproportionately high and adverse effects would likely fall on minority or low-income populations. Although the population in the immediate vicinity of the project area (Block Group 1 of Census Tract 504) is considered to be minority and low-income, the project would not result in a high and adverse impact to any of the analyzed resource categories, including environmental and economic categories.

9.8.6.11 Cultural Resources

The potential for cultural resources within the proposed project locations were investigated in preparation for compliance with both NEPA and Section 106 of the National Historic Preservation Act, as amended ("NHPA"). NEPA requires consideration of important historic and cultural aspects of our national heritage, while Section 106 of the NHPA requires federal agencies to "take into account" the "effect" that an undertaking will have on "historic properties." Historic properties are those included in or eligible for inclusion in the National Register of Historic Places (NRHP) and may include structures, buildings, districts, objects, and sites. In accordance with the Advisory Council on Historic Preservation (ACHP) regulations pertaining to the protection of historic properties (36 C.F.R. 800.4), federal agencies are required to identify and evaluate historic-age (50 years or older) resources for NRHP eligibility and assess the effects that the undertaking would have on historic properties.

Calcasieu Parish Facility

Affected Resources

Project historians reviewed the NRHP and the Louisiana Cultural Resource Map (sponsored by the Louisiana Department of Culture, Recreation, and Tourism [LDCRT]) to identify any previously documented historic and archeological historic resources in the project area. Under the NHPA, the Louisiana Office of Cultural Development (LOCD) within LDCRT is given the role of the State Historic Preservation Office (SHPO). Archeologist Clayton M. Tinsley conducted initial visits to the proposed Calcasieu Parish facility location on November 7 and 8, 2011. HDR cultural resource staff completed additional field work at the Calcasieu Parish facility location the week of August 19-23, 2013.

A Phase I cultural resources survey of the project area was conducted to determine all potential impacts to cultural resources as required by NEPA and Section 106 of NHPA. A Phase I survey was conducted of the Calcasieu Parish facility site in August 2013 and did not identify any prehistoric archaeology. The survey did record one historic age archaeological site, which likely represents the scattered remains of a domestic dwelling dating to the 1930s or 1940s. The historic-age site was recorded at the southeast intersection of Joe Ledoux Road and Big Lake Road. The site lacked contextual integrity and would not

be recommended as eligible for listing in the NRHP. No further work would be recommended for this facility.

Environmental Consequences

Because no NRHP-eligible historic resources were found during the Phase I survey of the Calcasieu Parish facility site, the proposed project would not be expected to have adverse impacts on cultural resources. A complete review of this project under Section 106 of the National Historic Preservation Act would be completed as environmental review continues. This project would be implemented in accordance with all applicable laws and regulations concerning the protection of cultural and historic resources

Plaquemines Parish Facility

Affected Resources

The facility would be located directly adjacent to the levee of the main channel of the Mississippi River. The Plaquemines Parish facility location has been heavily affected by development, land modification, and hurricanes. Two historic-age domestic residences were identified and photographed within the Plaquemines Parish location during a visit conducted in 2011 by HDR Archaeologist Clayton Tinsley. The photographs were subsequently examined by HDR Architectural Historian Ann Keen. The second building (the only one in existence today) has been heavily damaged by recent storm events. Historic-age cultural resources could be potentially affected in the project area. However, no known prehistoric cultural resources were discovered during that initial visit.

Environmental Consequences

The Plaquemines Parish facility has a low potential for buried cultural resources because of the significant alterations to the site; therefore no archaeological field work is anticipated to be required for this project facility location. The original historic-age houses have been either removed or extensively damaged. There is a very low probability that the remaining structure or any potential cultural resources would qualify for NRHP eligibility, therefore no direct or indirect effects are anticipated. As environmental review continues, direct and indirect effects of the proposed project on cultural resources along with any relevant planned mitigation measures of the Plaquemines Parish facility would be determined upon review of this project under Section 106 of the NHPA.

9.8.6.12 Infrastructure

Calcasieu Parish Facility

Affected Resources

The Calcasieu Parish facility is located off Big Lake Road, which is a two-way two-lane, undivided minor arterial. Based on information gathered from the LaDOTD, the flow of vehicular traffic appears relatively light along the portion of the highway adjacent to the site. Currently, there is no known infrastructure for onsite water supply.

Based on information from Louisiana One Call, Entergy provides electric service in the area and has electrical poles along Big Lake Road. Centerpoint Energy has a gas main in the area from which service can be extended; however, they do not have a gas main adjacent to the proposed project site.

Environmental Consequences

When in full operation, the facility is projected to attract approximately 15,000 visitors per year, translating to an average of 55 visitors per day. Carpooling is typical for a facility of this type; therefore, the number of vehicles that would approach the facility could be expected to be much lower than the number of visitors. The facility would be expected to mostly attract recreational road users (visitors on weekends), and as such, should not greatly impact the Annual Average Daily Traffic in the area. Although no major road improvements would be anticipated because of this project, minor improvements such as an exclusive right turn lane could be considered in the event that traffic studies determine the need for road improvement. Some traffic control devices such as reduced speed signage could also be necessary to accommodate the increase in vehicular and pedestrian traffic.

It is not anticipated that during construction or operations the increase in traffic would substantially affect the circulation network. A traffic control plan would be instituted during construction to provide for safe ingress/egress of construction workers, equipment and materials (e.g., scheduling, staging, signage, flagmen). With the incorporation of a traffic control plan, the effects associated with construction activities would be minimized.

During final design, the localized circulation network would be reviewed by a qualified traffic engineer to ensure that there are no adverse issues related to turning movements, queuing, ingress/egress, etc. Signage (in accordance with all local requirements) to the facility could be implemented at final design; however, at this phase of development, those types of details are unknown. If signage was included in the final plans, effects to traffic would be further minimized.

Water for the Calcasieu Parish facility would be sourced from proposed onsite wells and the offsite Turn Basin – a branch of the Calcasieu shipping canal and the Gulf Intracoastal Waterway. The offsite water supply basin is located approximately 0.5 miles north of the site; therefore a conveyance system is proposed to transport water to the site. Water from the basin will gravity-flow through a proposed intake screen and then into an adjacent concrete sump. Pumps within the sump are proposed to pump water at the rate of 500 – 1,000 gpm to the ponds through a proposed sub-surface 10-inch pipe. Two on-site wells, one for potable water and another for process water are also proposed to service the 2,400 ft² building and ponds, respectively. Potable water withdrawn from the wells would be needed for employees and visitors to the facility. Due to the limited number of staff needed to support the facility, it would be expected that groundwater supplies would be adequate to support the facility. During final design, an assessment would be conducted to identify the daily capacity of water needed to support the site and conduct an assessment of the groundwater supplies to determine if adequate volume of water is available. This assessment would need to verify that there would be no adverse effects on existing users of the groundwater supplies. In the event that groundwater supplies were found to not be available, potable water would be transported to the site. Other water needed for the facility would be

marine (salt water). It is, therefore, expected that groundwater would not be adversely affected by the project.

Design plans have not been formulated at this time; however, it would be expected that electric service would be supplied from the nearest pole along Big Lake Road. The type of connection will depend on the electric load required to operate the facility. During final design, coordination with the electric provider (Entergy) would ensure that all improvements are installed as required.

Based on discussions with Centerpoint Energy, a natural gas line can be extended to serve the proposed facility. As noted for electric service, design plans have not been formulated at this time. During final design, coordination with Centerpoint Energy would ensure that all gas facilities are installed as required.

Plaquemines Parish Facility

Affected Resources

The site for the proposed Plaquemines Parish facility is located off LA 23. Locally known as Belle Chasse Highway, LA 23 is a two-way, four-lane, divided road. A driveway access to the facility is located on the northbound side of the highway and there is a U-turn in the vicinity of the site for southbound traffic to obtain access to the property. The LaDOTD provides live traffic information for the portion of Belle Chasse Highway that is adjacent to the facility. These broadcasts indicate that there is no perceivable traffic congestion (e.g. traffic slow-downs) in the area even during peak morning and afternoon hours, suggesting that there is capacity for a higher usage.

A pump station and pipeline still exists near the Mississippi River; however, a conditions assessment of the pump and water line has not been conducted. Water service is available and provided by Severn Trent Services with meters already in place. Entergy currently has infrastructure along LA 23 and supplies electric power along that corridor. There is an existing electricity connection to the Plaquemines Parish facility. Natural gas is available through Atmos Energy from lines in place along LA 23, between Lacrosse Lane and Loafala Lane.

Environmental Consequences

When in operation, the facility is projected to attract approximately 1,000 visitors per year. Due to the current light road usage and the low volume of traffic projected to visit this facility, no major road improvements or installation of traffic signals are anticipated.

It is not anticipated that during construction or operations that the increase in traffic would substantially affect the circulation network. It is assumed that a traffic control plan would be instituted during construction to provide for safe ingress/egress of construction workers, equipment and materials (e.g., scheduling, staging, signage, flagmen). With the incorporation of a traffic control plan, the effects associated with construction activities would be minimized.

During final design, the localized circulation network would be reviewed by a qualified traffic engineer to ensure that there are no adverse issues related to turning movements, queuing, ingress/egress, etc. Signage (in accordance with all local requirements) to the facility may be implemented at final design;

however, at this phase of development, those types of details are unknown. If signage is included in the final plans, there would be no adverse effects to traffic.

Water for facility operations at the Plaquemines Parish facility would be sourced from the Mississippi River. Existing pumps would be used to convey fresh water from the Mississippi River into holding ponds and then to the proposed facility.

Capacity for potable water for use in the building is readily available through Severn Trent Services. According to the provider, two or more water meters are currently in place. Potable water would be supplied to the facility via connections to the trunk line that runs along LA 23.

Although a load sheet was unavailable during discussions with the provider, Entergy anticipates they can service the facility with electric power and does not foresee any issues with regard to load. Based on the current site plan, Entergy may require an onsite pad, built to flood elevation, and use multiple connection points to deliver power.

To provide natural gas service to the facility, Atmos would need to install a service line from LA 23 to the facility point of metering. As noted for the electric services, final design has not progressed to the point of design of the infrastructure. During final design, coordination with Atmos Energy would occur to ensure that all gas facilities are installed as required. Potable water would be provided by Severn Trent Services. At this time, project design has not quantified the amount of water needed and waste water generated by the facility. Due to the fairly small size of the facility, it is not anticipated that this would be a limiting factor. Coordination with the water department would occur to verify that water/wastewater services can be adequately supplied.

Construction and operation of the proposed project is not anticipated to adversely impact the existing infrastructure.

9.8.6.13 Land and Marine Management

Under the Louisiana State and Local Coastal Resources Management Act of 1978, the LDNR Office of Coastal Management (OCM) is charged with implementing the Louisiana Coastal Resources Program (LCRP). OCM's authority derives from Louisiana Revised Statute 49:214.21. The OCM administers the Coastal Use Permit (CUP) program to ensure activities in the Coastal Zone are performed in accordance with the guidelines in the LCRP. The CUP program specifically focuses on activities that may result in the loss of wetlands and aquatic resources. The proposed project would comply with all requirements of the CUP program, ensuring that project activities will have no direct or significant impact on state public resources or the natural and human environment.

Calcasieu Parish Facility

Affected Resources

According to the Calcasieu Parish Police Jury GIS interactive website (<http://cppj.totaland.com/>), the project site for the Calcasieu Parish facility was designated and coded as being zoned for "i2, Heavy Industrial". The area surrounding the project site was largely zoned Heavy Industrial, with the exception of a few small tracts west of Big Lake Road being zoned as "mhp, Manufactured Home Park" and "a1,

Agricultural” and the area adjacent to the east of the project site being zoned as “i2r, Heavy Industrial Restricted” and “r2, Mixed Residential” (see Figure 9-25). The southeast section of the project site was also zoned by Calcasieu Parish as having “Parish Higher Standards”, having a particular provision regulating elevation. The tract is located in Floodzone “AE”, typically having a construction elevation requirement of 11 feet. Due to known flooding in this area, Calcasieu Parish Government has implemented the provision that constructed buildings on this site be elevated to 12 feet (Figure 9-26).

Land uses in the vicinity include agriculture, boat launches, docks, residential housing, barge terminal, oil and gas production, and local industry. There are no schools, churches, cemeteries, hospitals, or other public buildings on the Calcasieu Parish land tract. Natural land features within the tract include emergent wetlands, mima mounds, and forested wetlands. Natural streams, bayous, rivers and lakes surround the location and are used to support recreational and commercial fishing and navigation.

Environmental Consequences

Although the facility location and placement of the intake pump and pipeline are outside of the Louisiana Coastal Zone, a Joint Permit Application would still be submitted to the LDNR OCM and forwarded to the USACE and Louisiana Department of Environmental Quality for Section 10/404 permit review for potential impacts to Waters of the U.S., including wetlands. The proposed project facility and associated discharge would not be expected to have adverse impacts to land use and will have no effect on current land use zoning designated by Calcasieu Parish.



Figure 9-25. Calcasieu Parish facility land use zoning.

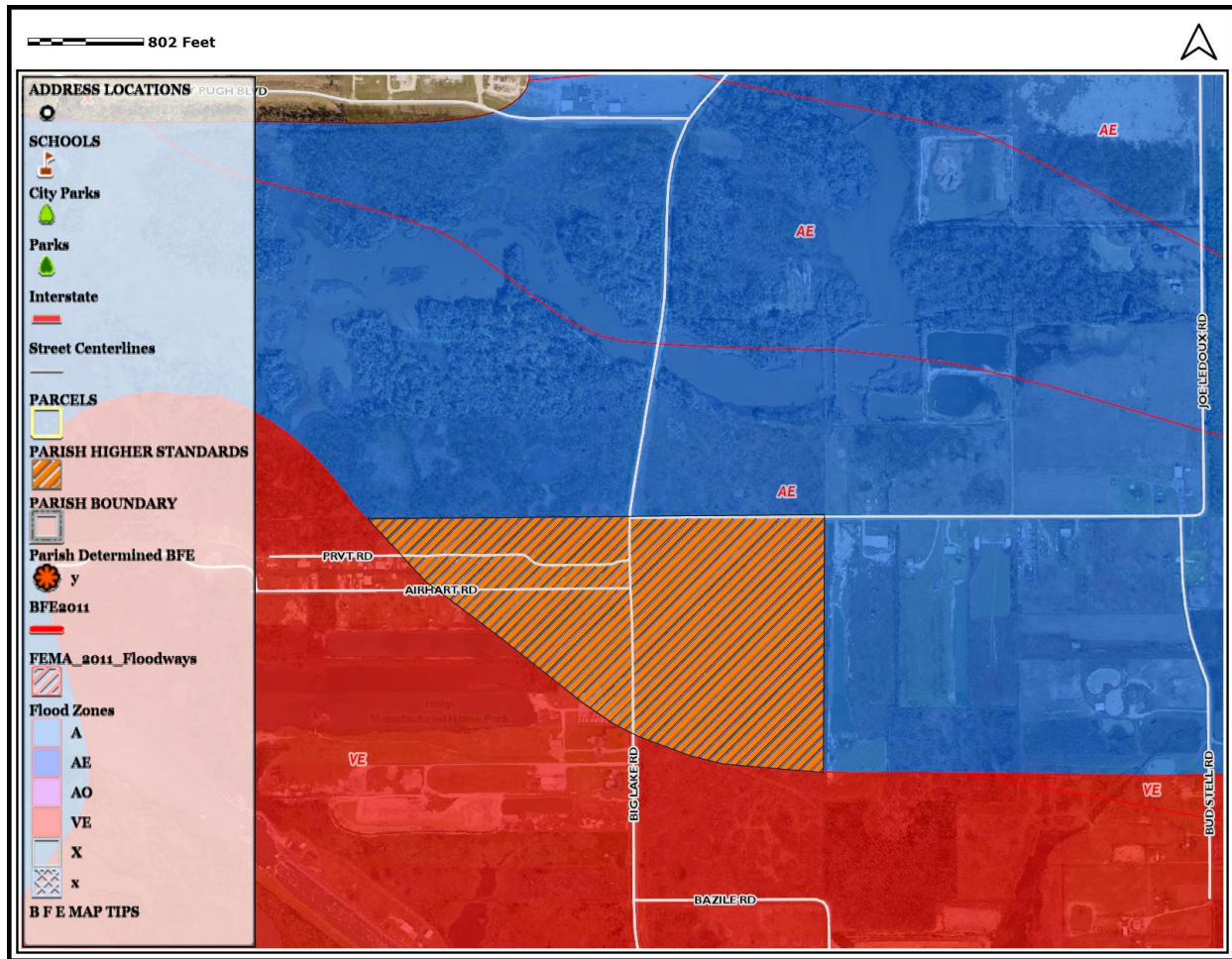


Figure 9-26. Calcasieu Parish facility flood zones.

Plaquemines Parish Facility

Affected Resources

Discussions had with the Plaquemines Parish Planning and Zoning Department revealed that the Plaquemines Parish facility falls within the Plaquemines Parish Flood Plain District. This District comprises areas subject to periodic or occasional inundation from stream overflows, storms, and tidal conditions. The use of property and buildings or structures within the Flood Plain District are subject to residential, commercial, and industrial requirements of the Plaquemines Parish Building and Sanitary Codes. Permitted land use of this property is limited to single and two-family residences, farming and keeping of agricultural livestock, public recreation, fishing/hunting lodges, camps, boat houses/docks, shipyards, marinas/yacht club, oil field services and supply companies, warehouses, mineral extraction and development of natural resources, and ice making plants. Mobile homes and all other commercial and industrial uses of properties within the Flood Plain District are subject to the approval of the Parish Council.

The Plaquemines Parish facility was once State property that was leased as a citrus and coastal plant research facility. The project facility site has already been heavily impacted because of this

development and land modification. Land use in the vicinity includes conventional agriculture, citrus orchards, residential housing, oil and gas production, river transportation, and local industry. Natural land features surrounding the facility are typical of riverine and marsh habitat.

The proposed project area lies entirely within the Louisiana Coastal Zone as designated by LDNR OCM.

Environmental Consequences

The LCRP requires compensatory mitigation for impacts to vegetated wetlands in the Louisiana Coastal Zone. It is likely that the proposed project would require a CUP because the entire Plaquemines Parish facility is located within the Louisiana Coastal Zone. A Joint Permit Application would be submitted to OCM and USACE for a CUP and USACE authorization under Section 10/404. Construction may result in adverse impacts to vegetated wetlands within the footprint of the construction area; these impacts would be mitigated by fulfilling compensatory mitigation requirements. See Section 9.8.6.3 for a description of wetlands on the site.

Improvements and activities associated with this facility would require a Coastal Use Permit and approval from the Parish Council, but would have no impact to land use zoning as it would be consistent with local zoning regulations.

9.8.6.14 Aesthetics and Visual Resources

Calcasieu Parish Facility

Affected Resources

The proposed project would be located at 8277 Big Lake Road in Lake Charles, Louisiana. The facility is undeveloped and its natural land features include emergent wetlands, mima mounds, forested wetlands, streams, bayous, rivers, and lakes. Oil and gas infrastructure is present in surrounding areas, as are port traffic and recreational and commercial fishing.

Plaquemines Parish Facility

Affected Resources

The proposed project would be located at 22193 Highway 23 in Port Sulfur, Louisiana and would consist of construction within a fastland area adjacent to the Mississippi River within the Louisiana Coastal Zone. The landscape surrounding the project area is characteristic of natural riverine habitats and supports rural residential, agricultural, and industrial areas along LA 23 and the Mississippi River.

Both Facilities

Environmental Consequences

The use of large equipment could have a temporary, adverse visual impact during project construction. These short-term construction-related impacts to visual resources would be minor. The design of the proposed Calcasieu Parish facility is intended to have an attractive aesthetic that would blend into the southwest Louisiana landscape and be attractive to visitors. However, it would result in a permanent change to the existing landscape. Impacts to visual and aesthetics as the Calcasieu facility would be long term and minor.

The rehabilitation of the proposed Plaquemines Parish facility would benefit local aesthetics as compared to the current condition, which reflects the adverse impact of hurricane damage. Overall, there would be a long term moderate net benefit to visual and aesthetics as the Plaquemines Parish facility.

9.8.6.15 Tourism and Recreational Use

Calcasieu Parish Facility

Affected Resources

There are limited tourism facilities in Calcasieu Parish near the proposed facility location. The City of Lake Charles has tourism infrastructure, including hotels and restaurants.

Plaquemines Parish Facility

Affected Resources

There are limited tourism facilities in Plaquemines Parish near the proposed facility location. Tourism is primarily associated with fishing and other outdoor recreational activities.

Both Facilities

Environmental Consequences

Both facilities would provide a venue for public recreation and education, as well as a research and production center for marine species to be used by LDWF, local academia, and the general public. It is anticipated that the proposed project would benefit tourism through the recreational and educational use of the project facilities, with the greatest benefit in the vicinity of the Calcasieu Parish facility because of the visitor's center at that location. The proposed Calcasieu Parish facility is anticipated to benefit from convenient access and good exposure, as it would be located off a prominent highway in the area. Interstate access to the Calcasieu Parish facility is available via I-10. Along I-10, around the City of Lake Charles, the Interstate Highway 210 turns south and connects to Highway 385 which splits and leads to Big Lake Road. Local visitors heading from areas to the east of the tract can use E Gauthier Road (Highway 3092).

9.8.6.16 Public Health and Safety and Shoreline Protection

Both Facilities

During the operations of the fish hatchery, chemicals that may be classified as hazardous may be transmitted, stored and used on site in minor quantities. The chemicals that may be considered for use during fish husbandry operations include formalin, chelated copper, praziquantel, oxytetracycline, potassium permanganate, MS222, hydrogen peroxide and tamed iodophors. All chemicals used are to be approved by USDA for fish.

All employers with hazardous chemicals in their workplaces must have labels and Material Safety Data Sheets for their exposed workers, and train them to handle the chemicals appropriately (OSHA 2013). These chemicals will be stored in the appropriate container types (by classification) and will be restricted from public access.

In addition to the hazardous materials discussed above, there is a potential that it may be necessary to transmit, store and handle medications (e.g., antibiotics) to control diseases (e.g., fungal infections) of the fish. Existing regulations are in effect that would result in minor adverse effects. All chemicals will be stored in appropriate containers restricted from the public and with certain chemicals, in explosion proof cabinets/rooms with temperature controls.

In the event of an emergency, police, fire, and hospital facilities would be able to adequately serve the project locations. The Calcasieu Parish Sheriff's office and Cajun Country Fire Department are both located approximately five miles from the site in Lake Charles. Women and Children's Hospital is located approximately six miles from the site in Lake Charles. The Plaquemines Parish Sheriff's office and Port Sulfur Volunteer Fire are both located approximately 10-11 miles from the site in Port Sulfur. The Plaquemines Medical Center is located approximately 12 miles from the site in Port Sulfur.

Shorelines near the Calcasieu Parish facility currently appear to be stable through natural stabilization and manmade features such as articulated concrete matting and vegetation.

Construction of the Plaquemines Parish facility is planned within 1,500-ft of the channelized and highly altered Mississippi River shoreline. The Mississippi River and Tributary levee system bordering the river appears to be stabilizing the shoreline.

Environmental Consequences

The transportation of hazardous materials is regulated by the Department of Transportation. Safe handling, storage and disposal of these types of chemicals are mandated by a variety of Federal and state regulations, including OSHA. Employees whose responsibilities include handling hazardous materials must undergo training. Therefore, with the required adherence to the established regulations required for the transportation, storage and handling of hazardous materials, no adverse effects to public health or environment are expected to occur associated with the use of minor amounts of hazardous materials at the facilities.

Personal protective equipment would be required for all construction personnel and authorized access zones would be established at the perimeter of the site during construction. Construction of the Calcasieu and Plaquemines Parish facilities is not anticipated to have any impacts on nearby shorelines. Shoreline stabilization measures would be incorporated into design as needed in areas where the potential exists for erosion to occur in order to protect marine resources and ensure public health and safety. As a result, no impacts to public health and safety are expected to occur from the implementation of the Proposed Action.

9.8.6.17 Phase I Environmental Site Assessment

As part of due diligence, an ASTM-conforming Phase I Environmental Site Assessment would be completed for both proposed locations as part of the development of negotiated arrangements for long-term land use with the site owners. The first step of a Phase I Environmental Site Assessment is typically an environmental records search that searches for hazardous waste sites on or near the locations of interest. On September 13, 2013, an environmental records search was requested through Environmental Data Resources, Inc. (EDR, Inc.), a national environmental database provider for

hazardous waste sites that are known to regulatory agencies. EDR searched environmental databases for the subject sites, and a buffer zone surrounding the subject sites, for all databases (federal, state, local, and tribal) listed in the American Society for Testing and Materials (ASTM) E 1527-05 guidance for the performance of Phase I Environmental Site Assessments. The distances searched vary for each database (up to 1 mile), in accordance with ASTM requirements, because different issues have different potential travel distances of contaminants. No proposed, active, or delisted National Priority List “Superfund” sites were found within 1 mile of both proposed site locations.

It is important to note that not all of the required elements of an ASTM-conforming Phase I have been conducted yet, only the database search task. A site visit by a qualified Environmental Professional (as defined in ASTM E 1527), review of historical source data, review of specific case files, and interviews with representatives of businesses in the area would be conducted when the Phase I assessments are completed. Based on the Phase I results and conclusions, recommendations for additional investigation or remediation could be proposed at that time.

9.8.7 Summary and Next Steps

Per the Purpose and Need of the Draft Phase III ERP/PEIS, four alternatives are considered, including a no action (Alternative 1), selection of project types emphasizing habitat and living coastal and marine resources (Alternative 2), selection of project types emphasizing recreational opportunities (Alternative 3), or selection of a combination of both habitat and living coastal and marine resources and recreational opportunities (Alternative 4). As proposed, the Louisiana Marine Fisheries Enhancement, Research, and Science Center implements restoration techniques within Alternatives 3 and 4.

The proposed Louisiana Marine Fisheries Enhancement, Research, and Science Center would establish state of the art facilities to responsibly develop aquaculture-based techniques for marine fishery management. The proposed project would include two sites (Calcasieu Parish and Plaquemines Parish) with the shared goals of fostering collaborative multi-dimensional research on marine sport fish and bait fish species; enhancing stakeholder involvement; and providing fisheries extension, outreach, and education to the public. The project is consistent with Alternative 3 (Contribute to Providing and Enhancing Recreational Opportunities) and Alternative 4 (Preferred Alternative).

Draft NEPA analysis of the environmental consequences suggests that minor adverse impacts to some resource categories and no moderate to major adverse impacts are anticipated to result. The project would provide long-term benefits by supporting the State of Louisiana’s ongoing management of its saltwater sport fishery. The proposed facilities would support research, hatchery production of sport fish and baitfish, and public education and outreach. The Trustees have started coordination and reviews under the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Historic Preservation Act, the Marine Mammal Protection Act, the Bald and Golden Eagle Protection Act, Coastal Zone Management Act, and other federal statutes. The Trustees will consider public comment and information relevant to environmental concerns bearing on the proposed actions or their impacts. Final determination on this project will be included in the final Phase III ERP/PEIS and Record of Decision.

9.8.8 References

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9.9 Cumulative Impacts of Phase III Early Restoration Projects Proposed in the State of Louisiana

9.9.1 Introduction

This section analyzes the potential for cumulative impacts to resources to occur as a result of the Phase III early restoration projects proposed in Louisiana. The projects are physically separate from each other and are distributed across a large area of coastal Louisiana. The potential for cumulative impacts was therefore analyzed at appropriate smaller regional scales.

In developing the following cumulative impact analysis, the cumulative actions discussed in Chapter 6 were considered (e.g. marine transportation, oil and gas, etc.). As part of the cumulative analysis, past, present and reasonably foreseeable future actions were identified. This analysis considers the incremental contribution of proposed Phase III early restoration projects to potential cumulative impacts to resources discussed in Chapter 3. The analysis includes resources that are relevant to the concerns identified on the smaller regional scale.

For Louisiana, DOI intends to adopt existing NEPA analyses, including cumulative impacts analyses, for three locations of the proposed Louisiana Outer Coast restoration project: Chenier Ronquille, Shell Island (East and West Lobes), and Caillou Lake Headlands. These cumulative impact analyses are briefly summarized below in Section 9.9.2. For the remainder of the proposed Phase III projects in Louisiana, three regional analyses were developed where past, present, and reasonably foreseeable future actions have, are, or could take place and result in cumulative impacts to the affected resource when combined with the impacts of the projects being considered.

Analysis 1: Breton Sound

Analysis 2: Calcasieu Parish in the vicinity of Lake Charles

Analysis 3: Southeastern Plaquemines Parish

9.9.2 Summary of Existing Cumulative Impact Analyses for Three Barrier Island Locations

As discussed previously, DOI has independently evaluated the LCA EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010), the Chenier Ronquille EA, BA-76, prepared by NOAA (2013) ,and the Louisiana Coastal Area (LCA) Barataria Basin Barrier Shoreline Restoration Final Integrated Construction Report and Final Environmental Impact Statement (EIS) (USACE 2012a) and intends to adopt these three documents to fulfill DOI's NEPA requirements for analysis of the Caillou Lake Headlands, Chenier Ronquille, and Shell Island (East and West Lobes) locations of the Louisiana Outer Coast Restoration project, respectively. The cumulative impact analyses included in these documents consider the direct and indirect impacts of past, present, and reasonably foreseeable future events in the analysis of proposed project consequences, including other Federal, State, local, and private restoration efforts across coastal Louisiana.

The EA analysis completed for Chenier Ronquille (NOAA 2013) and the EIS analysis completed for Shell Island (USACE 2012) considered the effects of the Spill in the analyses included in these documents. The

Spill was not previously considered in the LCA EIS for the Terrebonne Basin Barrier Shoreline Restoration (USACE 2010) that includes analysis of the Caillou Lake Headlands project, and therefore the environmental consequences of the Caillou Lake Headlands alternatives were not considered in light of the Spill. However, the environmental consequences of the Caillou Lake Headlands alternatives would occur regardless of the Spill and are would not materially change because of the Spill.

The proposed implementation of all four locations of the Louisiana Outer Coast Restoration project does not represent a material change in the cumulative impact analyses already completed for the Chenier Ronquille, Caillou Lake Headlands, and Shell Island (East and West Lobes) locations. Each of these cumulative impact analyses already considered other barrier island restoration efforts across coastal Louisiana as part of their analysis of past, present, and reasonably foreseeable future events.

9.9.3 Breton Sound (North Breton Island)

Table 9-9 summarizes the impacts to resources associated with the proposed North Breton Island location of the Louisiana Outer Coast Restoration project. This project location is not grouped together for a cumulative analysis with other proposed Phase III projects in Louisiana because of its location in Breton Sound, on the opposite (east) side of the Mississippi River from the other proposed Phase III projects in Louisiana (see Figure 9-1). This project location is evaluated to determine if the effects of restoration on North Breton Island, when combined with other past, present, and reasonably foreseeable actions in Breton Sound, may result in cumulative effects to resources.

Cultural resource investigations and consultations would be completed for all the proposed Phase III projects that are selected for implementation. Although no cumulative impacts to cultural resources are anticipated, there is insufficient information at this time to make determinations. If cultural resources would be impacted, mitigation identified during the consultation process would be implemented.

Table 9-9. Summary of Impacts of Proposed Phase III Early Restoration Project- North Breton Island location of the Louisiana Outer Coast Restoration Project.

	Geology and Substrates	Hydrology and Water Resources	Air Quality and GHGs	Noise	Living Coastal and Marine Resources	Protected Species	Habitats	Socioeconomics and Environmental Justice	Land and Marine Management	Aesthetics and Visual Resources	Tourism and Recreational Use	Infrastructure	Public Health and Safety and Shoreline
Early Restoration Proposed Project													
North Breton Island	s	s	s	s	+/s	+/s	+/s	+	NE	s	+/s	NE	NE

- Represents an adverse effect

+ Represents a beneficial effect

s Represents a short-term adverse effect

NE represents no effect

+/s represents a long-term beneficial effect, but a short-term adverse effect

The impacts of the proposed North Breton Island location of the Louisiana Outer Coast Restoration project that are most relevant to consider for assessment of cumulative impacts are:

- Short-term, minor adverse effects to water quality and noise during construction.
- Short-term, minor adverse effects to living coastal and marine resources during construction, with an overall long-term major beneficial effect on vegetation, wildlife, and marine and estuarine fauna.
- Short-term, moderate adverse impacts to piping plovers and red knot due to construction and dredging related disturbances, with the proposed project ultimately restoring and increasing the longevity of piping plover critical habitat by restoring dune and beach habitat. Best management practices to protect piping plover, red knot, and piping plover critical habitat will be developed during ESA section 7 consultation with USFWS and will be followed during construction.
- Minor socioeconomic benefits through increased employment during construction. Key past, present and reasonably foreseeable future actions included in this analysis include on-going refuge management activities as discussed in the Delta and Breton National Wildlife Refuges Comprehensive Conservation Plan (CCP) (USFWS 2008) and a variety of on-going general activities in Breton Sound, including marine transportation, on-going oil and gas industry activities, on-going commercial fishing activities, and on-going tourism and recreational activities associated with the Delta and Breton National Wildlife Refuges. No Phase I or Phase II early restoration projects contribute to cumulative impacts for North Breton Island activities.

Past, present and reasonably foreseeable activities in Breton Sound have contributed to adverse cumulative effects to certain resources. Activities that result in coastal land loss contribute to adverse cumulative effects to habitat and living coastal marine resources, including sensitive habitats and protected species. Ongoing activities in Breton Sound, such as marine transportation activities (including shipping and dredging), commercial fishing, and activities associated with the oil and gas industry can contribute to impacts to resources such as water quality, noise, habitats, and living coastal and marine resources. Visitor use at the Delta and Breton National Wildlife Refuges also can contribute to impacts to resources. The Phase I early restoration project “Louisiana Oyster Cultch Project” includes cultch placement locations in Breton Sound. The proposed North Breton Island location of the Louisiana Outer Coast Restoration project is not expected to affect these oyster resources. There are no other Phase I or Phase II early restoration projects that contribute to cumulative impacts for the proposed North Breton Island location of the Louisiana Outer Coast Restoration project.

There are also environmental stewardship and restoration activities that have occurred, are underway or proposed for Breton Sound. For example, on-going refuge management activities are discussed in the Delta and Breton National Wildlife Refuges Comprehensive Conservation Plan (CCP) (USFWS 2008).

Overall, the proposed North Breton Island location of the Louisiana Outer Coast Restoration project would result in minor short-term incremental contributions to effects on geology and substrates, water quality, air quality, noise, and visual resources in Breton Sound, but would not substantially contribute to adverse cumulative impacts in the region for these resources. Although the proposed project would likely result in short-term moderate adverse impacts to protected species, other living coastal and

marine resources, and their habitats, the proposed project would ultimately restore and increase the longevity of habitat, including critical habitat for protected species, on the island. Thus, the project would not contribute incrementally to cumulative adverse impact to protected species or their habitats.

List of past, present and reasonably foreseeable actions that have been considered as part of this analysis:

1. Delta and Breton National Wildlife Refuges Comprehensive Conservation Plan (CCP) (USFWS 2008)
2. On-going marine transportation activities in Breton Sound
3. On-going commercial and recreational fishing activities in Breton Sound
4. On-going oil and gas activities in Breton Sound
5. Visitor use at Delta and Breton National Wildlife Refuges

In addition to foreseeable actions identified in the table above, in November 2013, NFWF announced initial projects to receive funding from the Gulf Environmental Benefit Fund (<http://www.nfwf.org/gulf/pages/gulf-projects.aspx>). More than \$112 million was obligated for 22 projects designed to protect, restore and enhance natural and living resources across the Gulf Coast. Five of these projects are in Louisiana:

1. Caminada Beach and Dune Increment II: Engineering & Design
2. East Timbalier Island: Engineering & Design
3. Mid-Barataria Sediment Diversion: Engineering & Design
4. Lower Mississippi River Sediment Diversions: Planning
5. Increase Atchafalaya Flow to Terrebonne: Planning

The NFWF projects were recently announced. Because the projects in Louisiana focus on engineering and design and planning activities for potential future restoration projects, the Trustees do not believe that they will contribute to the cumulative impacts of the proposed Phase III actions in Louisiana. As more information becomes available, the Trustees may consider the implications of these projects as they relate to the assessment of the cumulative impacts of the proposed Phase III actions in Louisiana. As part of the comments on this Draft Phase III ERP/PEIS, the public is invited to comment on how the proposed projects contribute to cumulative impacts.

9.9.4 Calcasieu Parish in the vicinity of Lake Charles

Table 9-10 summarizes the impacts to resources associated with the proposed Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center. This project location is not grouped together for a cumulative analysis with other proposed Phase III projects in Louisiana because of its location in western Louisiana, more than 200 miles to the west of other proposed projects (see Figure 9-15). This project location is evaluated to determine if the effects of restoration in Calcasieu Parish in the vicinity of Lake Charles, when combined with other past, present, and reasonably foreseeable actions in this area, may result in cumulative effects to resources.

Cultural resource investigations and consultations would be completed for all the proposed Phase III projects that are selected for implementation. Although no cumulative impacts to cultural resources are anticipated, there is insufficient information at this time to make determinations. If cultural resources would be impacted, mitigation identified during the consultation process would be implemented.

Table 9-10. Summary of Impacts of Proposed Phase III Early Restoration Projects- Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center.

	Geology and Substrates	Hydrology and Water Resources	Air Quality and GHGs	Noise	Living Coastal and Marine Resources	Protected Species	Habitats	Socioeconomics and Environmental Justice	Land and Marine Management	Aesthetics and Visual Resources	Tourism and Recreational Use	Infrastructure	Public Health and Safety and Shoreline
Early Restoration Proposed Project													
Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center	-	-	-	s	-	NE	-	+	NE	+/s	+	NE	NE

- Represents an adverse effect

+ Represents a beneficial effect

s Represents a short-term adverse effect

NE represents no effect

+/s represents a long-term beneficial effect, but a short-term adverse effect

The impacts of the proposed Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center that are most relevant to consider for assessment of cumulative impacts are:

- Short-term, minor adverse effects to water quality and visual resources during construction.
- Short-term and long-term minor adverse effects to geology and substrates, hydrology and water quality, air quality, living coastal and marine resources and habitats resulting from construction and operations of the facility. Moderate adverse effects to wetlands on-site would require compensatory mitigation under Clean Water Act Section 404 permitting.

- Short-term and long-term socioeconomic and tourism benefits through increased employment during construction and on-going operation of the facility, including a visitor center.

Past, present and reasonably foreseeable activities in Calcasieu Parish in the vicinity of Lake Charles have contributed to adverse cumulative effects to certain resources. These activities include industrial expansion, commercial development, and restoration and environmental stewardship activities with various types of adverse impacts as well as benefits. Industrial expansion and commercial development projects such as refinery expansion and shopping mall construction would generally have adverse effects on geology and substrates, water quality, living coastal and marine resources, and habitats. The projects are providing socioeconomic benefits and benefits to infrastructure. Restoration and environmental stewardship activities at Black Lake and other locations provide benefits to geology and substrates, hydrology, living coastal and marine resources, and habitats. There are no Phase I or Phase II early restoration projects that contribute to cumulative impacts for the proposed Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center.

Overall, the proposed Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center would result in minor incremental contributions to effects on geology and substrates, hydrology and water quality, air quality, living coastal and marine resources and habitats in Calcasieu Parish in the vicinity of Lake Charles, but would not substantially contribute to adverse cumulative impacts in the region for these resources. Cumulatively, the proposed Calcasieu Parish location could provide a benefit to socioeconomic conditions and tourism and recreation in the region.

List of past, present and reasonably foreseeable actions that have been considered as part of this analysis:

1. ConocoPhillips Refinery Addition
2. Equistar Chemicals Facility Addition
3. Lake Charles Power Center (shopping center) Construction
4. PPG Industries Expansion
5. New export grain terminal at the Port of Lake Charles
6. Other Industrial/Commercial Expansion
7. Black Lake Terracing Project (marsh restoration)

In addition to foreseeable actions identified in the table above, in November 2013, NFWF announced initial projects to receive funding from the Gulf Environmental Benefit Fund (<http://www.nfwf.org/gulf/pages/gulf-projects.aspx>). More than \$112 million was obligated for 22 projects designed to protect, restore and enhance natural and living resources across the Gulf Coast. Five of these projects are in Louisiana:

1. Caminada Beach and Dune Increment II: Engineering & Design
2. East Timbalier Island: Engineering & Design
3. Mid-Barataria Sediment Diversion: Engineering & Design
4. Lower Mississippi River Sediment Diversions: Planning
5. Increase Atchafalaya Flow to Terrebonne: Planning

The NFWF projects were recently announced. Because the projects in Louisiana focus on engineering and design and planning activities for potential future restoration projects, the Trustees do not believe that they will contribute to the cumulative impacts of the proposed Phase III actions in Louisiana. As more information becomes available, the Trustees may consider the implications of these projects as they relate to the assessment of the cumulative impacts of the proposed Phase III actions in Louisiana. As part of the comments on this Draft Phase III ERP/PEIS, the public is invited to comment on how the proposed projects contribute to cumulative impacts.

9.9.5 Southeastern Plaquemines Parish

Table 9-11 summarizes the impacts to resources associated with the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center. This project location is not grouped together for a cumulative analysis with other proposed Louisiana Phase III projects because of its location along the Mississippi River, which is not connected to the locations of the Louisiana Outer Coast Restoration Project or to the Calcasieu Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center, more than 200 miles to the west (see Figure 9-16). This project location is evaluated to determine if the effects of restoration in southeastern Plaquemines Parish, when combined with other past, present, and reasonably foreseeable actions in this area, may result in cumulative effects to resources.

Table 9-11. Summary of Impacts of Proposed Phase III Early Restoration Projects- Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center.

	Geology and Substrates	Hydrology and Water Resources	Air Quality and GHGs	Noise	Living Coastal and Marine	Protected Species	Habitats	Socioeconomics and	Land and Marine Management	Aesthetics and Visual Resources	Tourism and Recreational Use	Infrastructure	Public Health and Safety and
Early Restoration Proposed Project													
Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center	s	-	-	s	s	NE	-	+	NE	+/s	+	NE	NE

- Represents an adverse effect

+ Represents a beneficial effect

s Represents a short-term adverse effect

NE represents no effect

+/s represents a long-term beneficial effect, but a short-term adverse effect

Cultural resource investigations and consultations would be completed for all the proposed Phase III projects that are selected for implementation. Although no cumulative impacts to cultural resources are anticipated, there is insufficient information at this time to make determinations. If cultural resources would be impacted, mitigation identified during the consultation process would be implemented.

The impacts of the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center that are most relevant to consider for assessment of cumulative impacts are:

- Short-term, minor adverse effects to geology and substrates, noise, and living coastal and marine resources during construction.
- Short-term and long-term minor adverse effects to hydrology and water quality, air quality, and habitats resulting from construction and operations of the facility. Based on conceptual plans, the operation of the hatchery would result in long-term, minor impacts to an inland marsh of the Barataria Estuary from the discharge of effluent water. This impact would be expected to be minor because the treatment of effluent in 0.5 acre settling ponds would be designed to meet applicable LPDES discharge standards.
- Short-term and long-term socioeconomic and tourism benefits through increased employment during construction and on-going operation of the facility.

Past, present and reasonably foreseeable activities in southeastern Plaquemines Parish have contributed to adverse cumulative effects to certain resources. These activities include activities at the site of the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center, such as the past operation of the LSU AgCenter and the current use of the site for the deposition of earthen material. Other activities in southeastern Plaquemines Parish include activities at the port of Venice, commercial development, and restoration and environmental stewardship activities with various types of adverse impacts as well as benefits. Industrial expansion and commercial development projects would generally have adverse effects on geology and substrates, water quality, living coastal and marine resources, and habitats. The projects are providing socioeconomic benefits and benefits to infrastructure. Restoration and environmental stewardship activities in the Parish provide benefits to geology and substrates, hydrology, living coastal and marine resources, and habitats. The Phase I early restoration project “Lake Hermitage Marsh Creation – NRDA Early Restoration Project” is also located in Plaquemines Parish but has no hydrologic connection to the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center and would not affect the same resources. There are no other Phase I or Phase II early restoration projects that contribute to cumulative impacts for the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center.

Overall, the proposed Plaquemines Parish location of the Louisiana Marine Fisheries Enhancement, Research, and Science Center would result in minor incremental contributions to effects on geology and substrates, hydrology and water quality, air quality, living coastal and marine resources and habitats in southeastern Plaquemines Parish, but would not substantially contribute to adverse cumulative impacts

in the region for these resources. Cumulatively, the proposed Plaquemines Parish location could provide a benefit to socioeconomic conditions and tourism and recreation in the region.

List of past, present and reasonably foreseeable actions that have been considered as part of this analysis:

1. Operation of the LSU AgCenter Coastal Area Research Station in Plaquemines Parish
2. Deposition of earthen material at the proposed project site
3. Operation of the Port of Venice
4. Lake Hermitage Marsh Creation – NRDA Early Restoration Project (Phase I early restoration project)
5. Buras Marina Remote Oyster Setting Facility
6. Elevating and partial paving of the Lake Hermitage Road

In addition to foreseeable actions identified in the table above, in November 2013, NFWF announced initial projects to receive funding from the Gulf Environmental Benefit Fund (<http://www.nfwf.org/gulf/pages/gulf-projects.aspx>). More than \$112 million was obligated for 22 projects designed to protect, restore and enhance natural and living resources across the Gulf Coast. Five of these projects are in Louisiana:

1. Caminada Beach and Dune Increment II: Engineering & Design
2. East Timbalier Island: Engineering & Design
3. Mid-Barataria Sediment Diversion: Engineering & Design
4. Lower Mississippi River Sediment Diversions: Planning
5. Increase Atchafalaya Flow to Terrebonne: Planning

The NFWF projects were recently announced. Because the projects in Louisiana focus on engineering and design and planning activities for potential future restoration projects, the Trustees do not believe that they will contribute to the cumulative impacts of the proposed Phase III actions in Louisiana. As more information becomes available, the Trustees may consider the implications of these projects as they relate to the assessment of the cumulative impacts of the proposed Phase III actions in Louisiana. As part of the comments on this Draft Phase III ERP/PEIS, the public is invited to comment on how the proposed projects contribute to cumulative impacts.

9.9.6 References

NOAA. 2013. Chenier Ronquille Barrier Island Restoration Project Environmental Assessment, Fed No. BA-76, Plaquemines Parish, Louisiana.